

A HITCHCOCK PUBLICATION

assembly & fastener ENGINEERING

MAY • 1968



When and Where to Use Custom Fasteners

Also in this Issue: **Butt-Welding Thin Gauge Metal**
New Fastener Drills and Taps Own Hole
The Economics of Pneumatic Tools

this man
had a
fastener
problem...



and here's how Pheoll solved it

It's no picnic . . . this rising cost of labor and material . . . especially to a cost-control engineer.

However, new ways are constantly being found to improve quality while cutting expenses. In this instance a cost-conscious engineer, working closely with a Pheoll Sales Engineer, discovered how he could save his company money on a brass terminal item.

The fastener in the picture formerly had a hole drilled laterally through the head, into which a wire was inserted and soldered. It was necessary also to prevent the terminal from turning as the nut was tightened.

Pheoll facilitated the assembly operation by producing a brass terminal with special lugs under the head to prevent turning . . . and also incorporated a wide slot, instead of a hole, in the head to speed and simplify the wire connection when soldering.

Result was the reduction in cost of producing this fastener by 66%. One more example of the cost-conscious quality engineering . . . custom work you can expect . . . when you bring your fastener problems to Pheoll.

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ENLARGED VIEW



HEADING
THE
FASTENER
INDUSTRY
FOR OVER
50 YEARS

assembly & fastener ENGINEERING

May, 1960

Volume 3, Number 5

FEATURES

- | | |
|--|----|
| When and Where to Use Custom Fasteners | 24 |
| Material specifications, plus examples of custom fasteners used in products from toys to television. | |
| The Economics of Portable Pneumatic Tools | 28 |
| A discussion of percussion and rotary power tools, plus considerations for operating costs, dependability, etc. | |
| Simple Fixture Tightens Housing Caps | 32 |
| Rotating device permits two screw caps to be tightened at once in aluminum housing. | |
| Relay Assembly in Controlled Atmosphere | 35 |
| A super-clean room at Clare plant houses six automatic 18-station machines used to assemble electronic relays. | |
| Butt Welding Thin Gauge Metal | 39 |
| Describing techniques involved in butt welding, plus roll planishing which smooths seam so it is invisible to naked eye. | |
| Mousetails Secure Missile Components | 45 |
| Rubber compound straps hold down capacitors, resistors and other components subjected to as much as 25 G's. | |
| New Fastener Drills and Taps Own Hole | 49 |
| A report on a fastener especially adaptable to light gauge sheet metal assemblies. | |
| 1960 Design Engineering Show | 52 |
| A press-time review of some of the products to be exhibited in New York City, May 23-26. | |

DEPARTMENTS

- 2 Letters to the Editor
- 7 The Editor's View
- 9 The State of Business
- 13 Industry at Work
- 17 Assembly & Fastening Ideas
- 21 Reports from the Field
- 59 What's New in Equipment
- 71 What's New in Fasteners
- 79 Useful Literature
- 95 Product Index
- 98 One Last Word

• Where design requirements preclude the use of a standard or a proprietary fastener for a specific application, a custom fastener must be tailored to the job. For a discussion of custom fasteners, turn to page 24.



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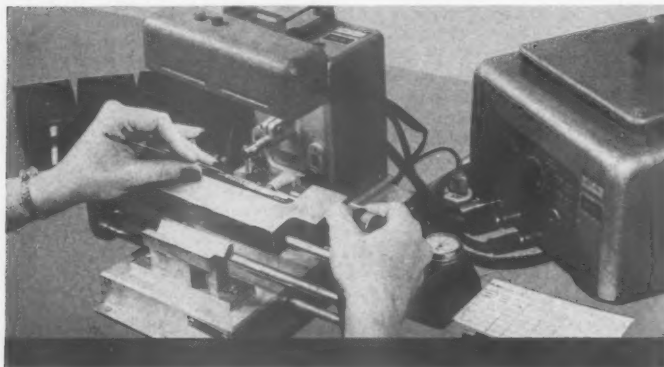
Subscription rates: \$6.00 per year in U.S.A., \$7.50 per year elsewhere. Copyright 1960 by Hitchcock Publishing Co., Wheaton, Ill. Phone MOntrose 5-1000. Cable address: HITCHPUB.

HOW TO PRODUCE

33 UNIFORM MINIATURE

WELDS OF

4 DIFFERENT METALS

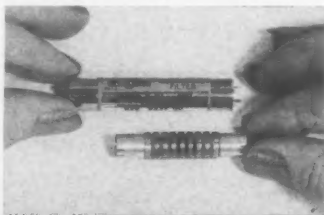


Collins Radio Achieves Production Goals with Weldmatic Welding

A new, exceptionally reliable mechanical filter—key component in the Collins version of the highly strategic Single Sideband Radio—is now in production using an all-welded construction provided by Weldmatic equipment. This advanced filter makes possible improved selectivity characteristics and better utilization of the radio spectrum. Unvarying uniformity of the weld nugget and absolutely no displacement of the positioned parts are required specifications. Electrical characteristics are extremely critical . . . each of 33 connections must be identical in production quantities! After extensive evaluation, Collins selected Weldmatic's 1032 Miniature Welding Head and Model 1026 Power Supply . . . the combination that has enabled Collins to meet its production goals. They're a real team for precision welding: the miniature head with perfect vertical electrode motion and accurate repeatable pressure—the power supply with ultra-short current flow (0.001 second) over a continuously variable heat range. Why not consider Weldmatic for your metal-joining problems? WRITE for our free 20-page brochure describing techniques, applications, and Weldmatic's sample welding service.



Weldmatic pressure gage reads firing force...calibrated from 0 to 50 lbs., insures exact weld pressures from job to job. (Right) Welded filter cartridge and completed miniaturized Collins filter.



WELDMATIC

950 ROYAL OAKS DRIVE • MONROVIA, CALIF.  DIVISION OF UNITEK CORPORATION

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Letters to the Editor

Torque Considerations

We would appreciate receiving a couple reprints of the article entitled "Torque Considerations in Design", by E. G. Wertheimer, as featured in your January issue.

Stephen Nagy
Engineer, Axle Division
Eaton Manufacturing Co.
Cleveland, Ohio

Would you please send us a reprint of "Torque Considerations in Design" . . .

W. T. Hunt, Manager
Laboratory and Services
Chrysler Corporation
Detroit, Michigan

Please send us a reprint of the article "Torque Considerations in Design".

Norman E. Geiger
Engineering Stds. Dept.
The Falk Corporation
Milwaukee, Wisconsin

Touch-and-Close Fasteners

Please refer to your March issue, page 86, where you show a picture of an application of detachable upholstery utilizing Velcro nylon "touch-and-close" fasteners. We would appreciate your advising us where we might contact the manufacturer of these fasteners.

R. G. Denny
Purchasing Department
Durham Manufacturing Co.
Muncie, Indiana

High Strength Bolting

We would appreciate your forwarding ten reprints of the article, "High Strength Structural Bolting", which appeared in your April issue.

H. Silverman
Chief Draftsman
John Dollinger Jr., Inc.
Beaumont, Texas

Managerial Rigor Mortis

We have reviewed your November editorial "Beware of Managerial Rigor Mortis" and believe the material contained would contribute to our training program.

Will you please inform us how we can purchase reprints of this material and what the lot price would be; or if we could reprint this ourselves, giving due credit to your publication.

Arthur E. Mudge, Consultant
Value Engineering & Analysis
Raytheon Company
Waltham, Massachusetts

ANOTHER BREAKTHRU in insert design

THE INSERT OF THE SPACE,
ELECTRONIC & AUTOMOTIVE AGE



SLIMINSERT

SEE IT AT THE DESIGN SHOW IN
NEW YORK CITY — WEEK OF MAY 23RD



ROSÁN, INC.

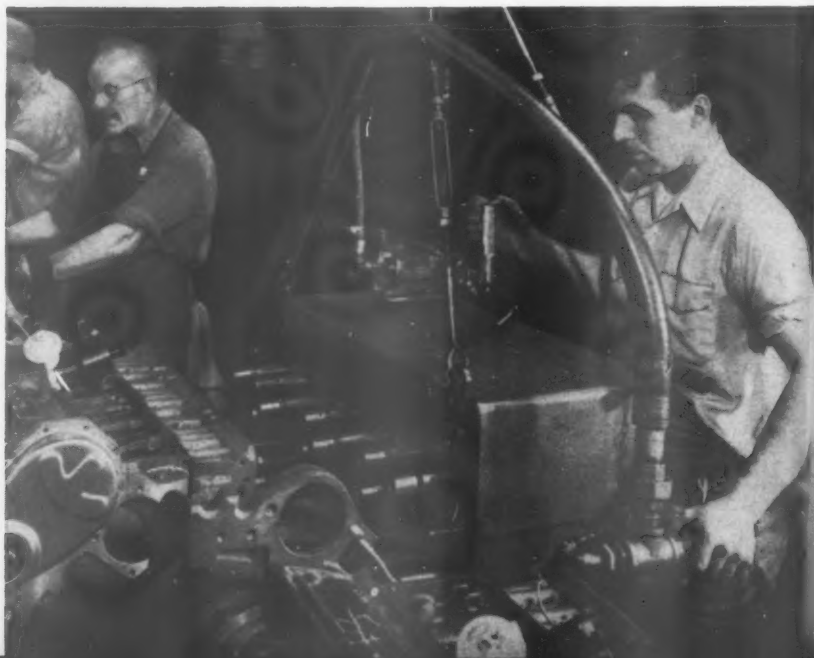
2901 West Coast Highway • Newport Beach, California

Designers and Manufacturers of the World's Finest Precision Fasteners



4-spindle Magnamatic Multi-runner.

CP Multi-runner makes installing 18 cylinder head bolts a one-shot operation.



YOU CAN

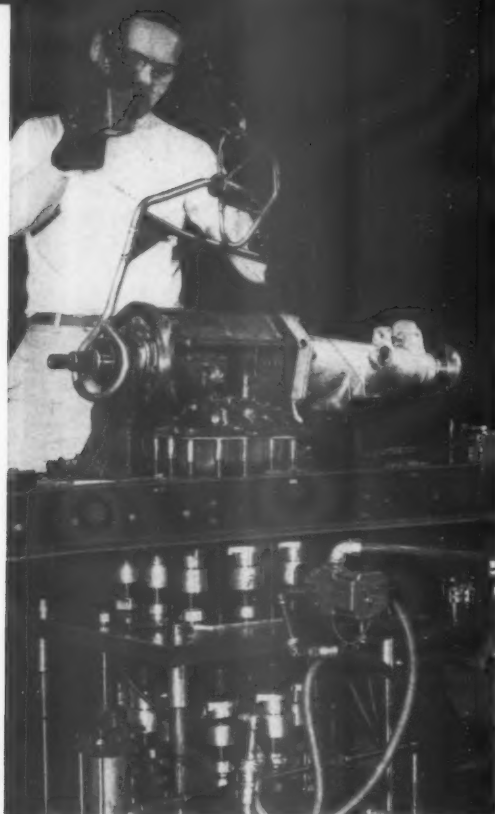
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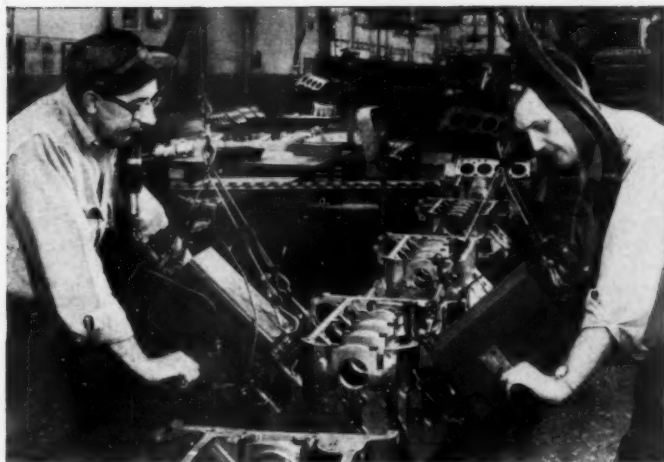
Put
han
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Pneum
Rock D



18-spindle Multi-runner drives $\frac{3}{8}$ " bolts on transmission oil pan assembly.



4-spindle Multi-runners make fast work of installing front motor mounts.



4-spindle Magnamatic Multi-runner sets cap screws on window regulator to uniform tightness, then releases instantly.

PUT "EXTRA QUALITY" INTO YOUR PRODUCT when you use CP MAGNAMATIC Multi-runners

Put CP Magnamatic Multi-runners in the hands of your assembly operators and every fastener—on every unit—will be run to the proper torque. You don't have to do "follow-up" tightening by hand. You can spot check instead of checking every unit. You can hold your quality while you cut your time.

Even inexperienced operators drive nuts, bolts and studs to exactly the prescribed torque, because every Magnamatic spindle has a patented clutch that disengages when

proper torque is reached. Despite variations in air pressure and motor wear, these clutch settings seldom require readjustment.

You can get Magnamatic Multi-runner units in five basic sizes, each adjustable within a wide range, handling torques from $\frac{1}{2}$ to 350 foot pounds.



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PLUG NUTS*

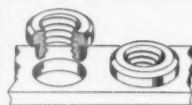
put
holding
power
into
light-gage
assemblies

Think of Plug Nuts as "portable tapped holes". Consider using them when you're faced with problems such as thread stripping, hole enlargement, loss of bolt tension, blind fastening, tight clearance. Assembly bottlenecks? Plug Nuts can be installed *before* many forming and finishing operations.

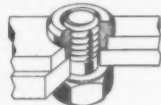
Current applications include instrument cabinets, cargo vans, metal window hardware, curtain walls. Give you any ideas?

Plug Nuts are made for use in any thickness of material down to .030" and in any tap size from #4 to 3/4". You can have them in case hardened steel, brass, various grades of stainless and aluminum in a full range of finishes. Write us for samples and descriptive literature.

*Patented



Plug Nut is easily seated with hand punch or small press. Positive clinching occurs when displaced hole material flows into knurls and annular groove.



Plug Nut does not affect flatness of product material, nor does it project through. Low profile bead is a real advantage where clearance is tight.



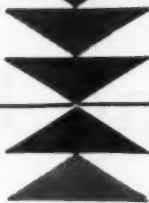
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Assembly and Fastener Engineering



THE EDITOR'S VIEW

MAY, 1960, VOL. 3, NO. 5

TAKE THAT TRIP, GET A NEW PERSPECTIVE



One blustery day in March we attended the first technical conference sponsored by the American Home Laundry Manufacturers Association. Though only a one-day affair, several hundred design, engineering and research men traveled to Chicago for the event. Several came from as far as Los Angeles.

"They descended upon us like a bolt out of the blue," reported one harried but happy Association official.

Nothing like the final attendance was expected. The meeting room was much too small for comfortable seating, but they crowded in anyway.

And they were there for the first morning paper which presented some new dimensions in the concept of a quality product, and stayed through the final afternoon talk concerned with designing for tomorrow's needs.

Now, coming up in late May is the Design Engineering Show which has become one of the giant trade shows in just a few years. Some 20,000 engineers from all over the country will travel to New York City for this event.

What benefits can be gained from attending these and the many other meetings and shows held each year? What makes engineers travel to more and more

such affairs? The habitue of conventions will cite the opportunities that exist for seeing and hearing about many interesting developments in a short span of time.

It's true that seeing many new products first hand stirs the imagination. The designer comes back with his brain teeming with new ideas. The engineer carries home in his pockets a collection of intriguing fasteners and new materials. The production man brings back a briefcase crammed with notes on new assembly techniques. Everyone benefits, even the company auditor who finds new conversation pieces in the expense accounts.

But most important is the new perspective that you can get just by being away from everyday activities. Traveling to and from another city gives new breadth to your living; meeting new people with different interests broadens your outlook on all fronts. Your imagination not only stirs, but soars to great heights.

This drastic change in your mode of living shatters routines which tend to become stale and unproductive. You come back with a fresh approach to your work. And much worthwhile is accomplished before routine catches you. Then it's time to travel again.

Matt E. Dunphy

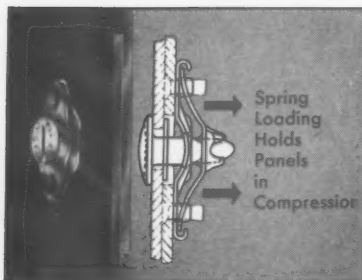
Managing Editor

Quick-Opening Fasteners

Selecting Small Fastenings for Metal Closures

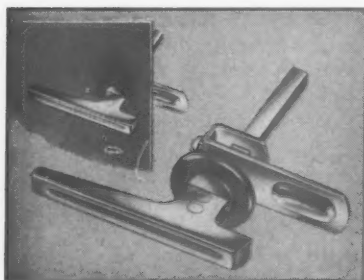
*"Use captive fasteners wherever feasible . . . Avoid the use of loose washers and loose nuts . . . Fasteners on equipment covers should be operable either with no tools or with standard hand tools"**

(John D. Folley, Jr. & James W. Altman, Research Scientists, American Institute for Research)



Quarter-Turn Fastener

Lion Fasteners open and close with a $\frac{1}{4}$ turn, hold sheets tightly under the compression of a rugged spring. Quickly operated and fully retained in the outer panel, they are approved under U. S. Government military specifications. Stud and receptacle float for easy alignment and simplified hole preparation. Flush, oval, wing, knurled, ring, and key head styles available. Sizes—No. 2, No. 5, and High Strength for extra heavy duty.

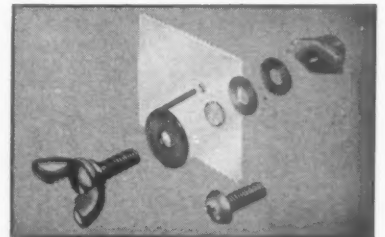


Cabinet Latch

Just drill a hole, push the fastener stem through, and slide the special push-on

clip into place. No welds, screws, bolts or rivets: the fastener is permanently installed in seconds!

Adjustable to any grip length or panel thickness, the pawl is fixed in place by a single set screw. The fastener's brightly finished knob is set off by a plated washer. Also furnished with screwdriver operated flush head.



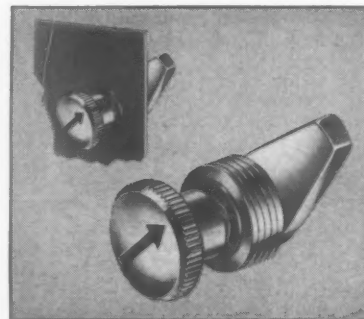
Adjustable Panel Latch

Small doors and panels can be fastened with greatest speed and lowest cost with the Southco Adjustable Latch.

The entire fastener is quickly installed through two holes punched in the door; no bolts or rivets are needed.

It operates with a quarter turn, requires no striker plate. An extra twist after the nylon pawl is engaged pulls up the door to form a seal and eliminate vibration.

Available with wing, knurled, or Phillips head.



Spring Tension Latch

For fastening slide-out drawers and hinged panels the Southco Arrowhead Latch is recommended. It locks or opens with a quarter turn yet occupies less than $\frac{1}{2}$ " inside space.

Doors are held under spring tension—a push against the arrowhead knob relaxes this tension, allows operation with fingertip ease. Drill a single hole for installation—no fastening to the door is necessary. No striker plate is needed.

Pawl stop is eliminated—arrowhead shows at a glance exact position of pawl.



Free Fastener Handbook

Send for your complete Southco Fastener Handbook, just printed. Gives complete engineering data on these and many other special fasteners.

Write on your letterhead to Southco Division, South Chester Corporation, 257 Industrial Highway, Lester, Pa.



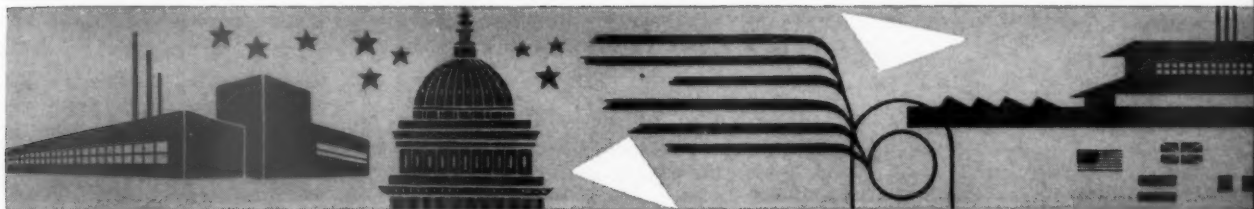
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* Quotation from "Designing Electronic Equipment for Maintainability"; Machine Design, July 12, 1956.

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Assembly and Fastener Engineering

The State of Business



IS FOREIGN STEEL HERE TO STAY?

By Robert M. Buddington
Inland Steel Company

From my office with its view of Lake Michigan I shared in the thrill of viewing the flotilla that came to Chicago last June as part of the celebration to honor the Queen and Prince and to mark the Chicago opening of the St. Lawrence Seaway.

The Seaway, through which steel imports in Chicago increased from 48,000 tons in 1958 to 256,000 in 1959, dramatically points out the changing position of the U.S. in world trade. A new water route into the heart of America opens at the very time that our trade position is at a crucial junction.

Foreign steel producers, especially those of the revitalized Japanese and European steel industries, are competing more aggressively for all export markets. A graphic indication of this competition is our own steadily declining share of world steel production, from 54% in 1946, to 35% in 1957 to 29% in 1958 and 1959.

Total steel mill product imports during 1959 were 4.4 million tons valued at \$15 million, an all-time high. At first this volume may not appear

as a serious penetration of American markets. But note the trend on the graph. Moreover, statistics do not convey the real impact of foreign competition, for it is at the level of the specific products, and against specific American steel producers, that this competition is most telling: producers of reinforcing bars, pipe and tubing, structurals and wire products. Coastal port areas like Galveston and Los Angeles are hardest hit.

Robert M. Buddington
Vice President—Sales
Inland Steel Company

Joining Inland as a trainee in 1939, Buddington was named general sales manager in 1955 and vice president in 1959. He was a naval pilot for four years during World War II.



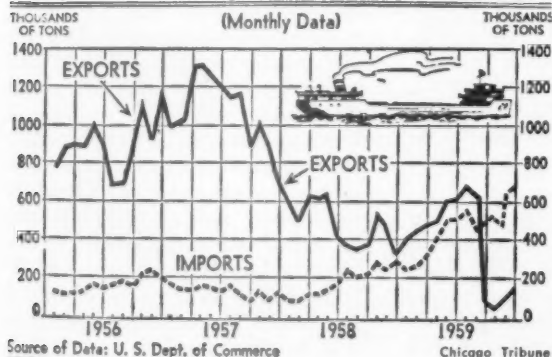
Declining steel exports are an equally important story. Exports in 1959 were the lowest since 1936. Part of this, of course, was due to the steel strike, but mostly to losses in sales. For the first time since 1903 the U.S. had an unfavorable balance of steel trade as imports exceeded exports by almost three million tons.

What are the prospects for future steel competition? There is no question that last year's import totals were boosted artificially by the steel strike. And the quick recovery to near-capacity production left many steel importers with large forward commitments which they were unable to sell at profit. Those losses are now making brokers cautious about taking on new orders for foreign steel. But this is just a readjustment phase and I am forced to conclude that foreign steel will be a permanent factor in our steel using markets.

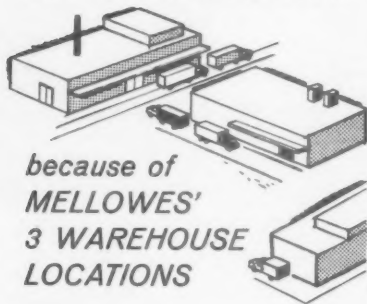
Foreign producers can undersell American steel by as much as 20 to 30%. They continue to expand steel capacity with modern facilities. Western Europe's capacity will grow 28% between 1959 and 1965. Quality has also improved.

continued

Exports and Imports of Iron and Steel



It's easier and less costly to buy Mellowes Lock Washers



Whether you're located in the eastern states, the mid-west, or on the west coast, you can get immediate, fast shipment of your lock washer orders from the Mellowes warehouse nearest you. Three Mellowes warehouses, fully stocked and located at strategic points, assure you of these important benefits:



- All orders for standard sizes and sections of Mellowes Lock Washers in Coin Pak, JOB-PAK, Standard Packages, or Bulk are shipped within 8 hours of the time received.

- If you are located within 500 miles of any one of these warehouses, you can expect "overnight" delivery of your lock washer orders, shipped via fast carrier, and freight will be prepaid on shipments of 200 lbs. or more.

CALL COLLECT!

All you have to do is to phone the nearest Mellowes warehouse long distance collect. Here are the numbers:

East Coast Warehouse
East Orange, N. J. ORange 6-0714

Mid-West (Home Office)
Milwaukee, Wis. COncord 4-5090

West Coast Warehouse
San Francisco, Calif. ATwater 2-2600

Mellowes warehouse locations and Mellowes policies make it easier and less costly for you to buy Mellowes Lock Washers. Give it a try! Phone collect today.

The Mellowes Company

143 E. Nash Street • Milwaukee 12, Wis.
Call Long Distance, Collect



A. W. Mellowes,
Founder and Chairman
of the Board

Notes:

This is one of a series of advertisements presenting Mellowes customer-service policies which benefit you, the buyer of Lock Washers.

AB-2030

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State of Business, continued

More aggressive marketing tactics are being adopted. American subsidiaries depots and warehouses are being provided.

What do we do? I agree with most that higher trade barriers is not the answer. We too are dependent on other nations for some of our raw materials, such as iron ore, tin, zinc. The economic health of the free world depends on equal and free access to trade.

Our government should continue to urge the removal of discriminatory restrictions against U. S. exports. At the same time, economically strong nations should be urged to shoulder their share of aid to under-developed countries.

We can start helping ourselves by developing a greater awareness of foreign trade. We do not know much about this complex subject—their production costs, not just labor costs—and what specific products they have a greater or lesser capacity to produce.

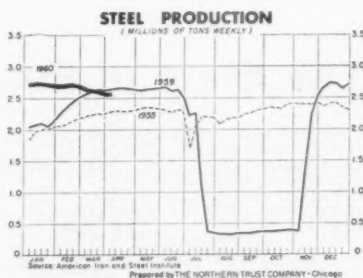
There has been a steady increase in American overseas capital investment. U. S. companies have built or purchased foreign manufacturing subsidiaries, or entered into joint venture or licensing agreements, in the belief that such devices are the only means of maintaining foreign sales.

The new European Common Market and the so-called Outer Seven are new factors making Western Europe an attractive location for such investment. American exports into any one Common Market nation now face trade barriers which competitive products from the other five member nations no longer face. Maybe this is an area steel companies should investigate more thoroughly.

We must continue to accelerate research and development towards improved and specialized steels.

Obviously, we must keep our costs and selling price as low as possible. And we can sell harder. Better service, closer communications, personalized selling, more accurate specifications, better

technical assistance. These are the things that we can improve at home and maybe even sell abroad.



Industry Briefs

Capital Airlines is hollering uncle in the face of air-scare and bad weather losses: requests a \$12.9 million Government subsidy covering the last year. All 12 long-haul airlines have been off dole since 1951 . . . Gas appliance manufacturers confess that first quarter sales were disappointing (down 5% from 1959) . . . Experts still hope that consumer prices will increase in 1960 at no greater pace than in 1959, which was 1.5% . . . Americans own 52% of Canada's economic resources, according to a survey by the Dominion Bureau of Statistics. Up 6% since 1954 . . . Appropriation bills for four Federal departments will add 27,803 new employees to Government payrolls this year . . . Senate talkaton on civil rights cost taxpayers \$22,000 an hour, the estimate of keeping the Senate in session . . . To strike or not? With their own wage talks deadlocked and refusing to agree to binding arbitration, 500,000 non-operating rail workers may wait to see what arbitrators offer the engineers before walking out; 36,700 engineers ask 34 cents; management—hoping to split the difference—wants a 15 cent per hour pay cut . . . Congressional Democrats will soon propose a farm program based on marketing controls. Output would be limited (eliminating marginal producers) and surpluses would be wiped out in 10 years. Prices would rise. Republicans object: "Any time this country adopts a program of scarcity, the consumer will be the loser."

STANSCREW

Symbol of a new concept

in fastener service

American industry is learning Stanscrew means extra values.

This symbol personifies a trained staff of fastener specialists. Their technical assistance can often help you reduce fastener and assembly costs.

It means extra quick deliveries from complete inventories maintained at three conveniently located plants . . . over 5,000 different types and sizes to assure a broad selection for the great majority of your requirements . . . and, above all else, fasteners of consistently high quality.

Although it first appeared in 1958, the Stanscrew trademark represents a wealth of fastener experience. For it combines the technical skills and specialized facilities of three major manufacturing divisions of Standard Screw Company, each an honored name for more than 80 years. They are:

THE CHICAGO SCREW COMPANY, BELLWOOD, ILLINOIS

HARTFORD MACHINE SCREW COMPANY, HARTFORD, CONNECTICUT

THE WESTERN AUTOMATIC MACHINE SCREW COMPANY, ELYRIA, OHIO

For fasteners, specify Stanscrew. For other needs of home and industry, Standard Screw divisions also produce:

Moen single-handle faucets • Hartford textile spindles

Roosa Master fuel injection pumps • Chicago tappets

Each division also provides a complete design and manufacturing service for cold headed and screw machine products.

STANDARD SCREW COMPANY

2701 Washington Boulevard • Bellwood, Illinois

Setko's 23 Years of
Progressive Engineering
Experience Keeps
Screws Modern as
Tomorrow's Products



We Specialize In
Solving Puzzling
Screw Problems

Vol. 3, Issue No. 1

Bartlett, Illinois (Chicago Suburb)

Progress Edition

NEW HOPPER FEEDER QUADRUPLER SET SCREW INSERTION RATES

Labor costs cut by 75%



Changeover from manual to automatic insertion of set screws is now easier and more profitable than ever. More profitable because this new, compact, Setko Hopper Feeder requires less space — and embodies advancements and refinements in design to make for greater operating efficiencies. It is now possible to actually quadruple insertion rates over the hand method, while cutting labor costs by 75%.

Operation of the machine is less complicated than the hand method. All the operator has to do is feed the workpiece to the receiving pad and the machine automatically drives the screw to a predetermined depth. Every screw is uniformly inserted.

Additional savings result from a reduction in rejects and floor loss. Users report "rejects have been cut to almost zero and floor loss has been eliminated!"

More than fifteen years of experience in the design, engineering and manufacture of Hopper Feeders is behind the cost-cutting, production-increasing performance of this new model.

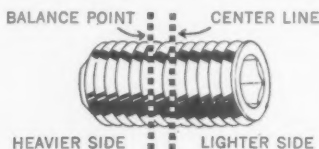
Feeds any type of headless set screw and with any point style



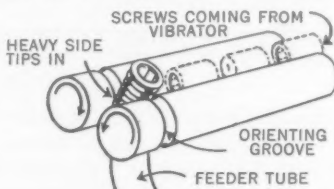
Hex Socket, Fluted Socket, Slotted or Slabbed heads and with any type point, can all be oriented and fed with equal efficiency. Even "specials" can be oriented in most cases.

Exclusive orienting mechanism assures perfect positioning of screw every time

It's really a matter of balance... Every type of set screw has a point of balance. Because of the manufacturing methods used it is almost never exact center. This means that from the center of the screw, one end is a little heavier. The object is to get the heavier end to tip consistently



into the feeder tube. Setko accomplishes this by feeding the screws from the vibrator to the orienting mechanism where it is literally wafted on a cushion of friction between two oppositely driven rollers.



A groove in each roller acts as a balancing point so that no matter which way the screw approaches, head first or point first, the heavier end tips into the groove and falls into the feeder tube.

Many Models Available

In addition to the air-operated table top model shown on this page, Setko has a complete line of Hopper Feeders for use

with vertical drill presses, etc. Various type driving and feeding mechanisms are available to assure the right combination for your operation.

Used on a Wide Variety of Products



Automated insertion of set screws is performed on these and many more products. The workpiece is simply fed to the receiving pad and the set screw is driven to a predetermined depth. In most cases the final tightening of the set screw takes place when the component is assembled to the main product. In some cases, the final inserting and tightening take place at one time.

Pays for itself in less than a year

Companies who have bought and are using Setko Hopper Feeders say that, "they pay for themselves in less than a year." In many cases, "much less than a year."

Send the Coupon Today for Full Information

Send your specifications for recommendations and quotations. Ask for Catalog 23 showing the full line of Setko Socket Screw Products.



Setko Screw & Mfg. Co.
705 Main Street, Bartlett, Illinois

☐ Send me complete information on your Hopper Feeding Method.

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Assembly and Fastener Engineering

A horizontal strip of black silhouettes representing various objects: a rocket, a car, a sword, a television, a rotary phone, a car, a hand reaching out, a jet, and a clock.

Fantastic speeds—essential to the testing of materials and designs of missiles and space craft—soon will be generated in industry's first major hypersonic wind tunnel.

Manufacture of the highly critical part was achieved by an unusual method requiring a massive aluminum hand forging—believed to be the world's largest—produced by Aluminum Company of America. The 8230-pound forging served as a core, or mandrel, for a coating of nickel that ultimately became the largest nickel liner ever made.

A cut was made that severed the small end of the mandrel. It was rejoined by running a bolt through the smaller section, and threading it tightly into an insert placed in the larger part.

continued



Nylok-Detroit is fully equipped to add locking, sealing, adjusting nylon inserts to any threaded part—regardless of size, shape or material! What's more, you may furnish your own parts to have the pellet inserted—or purchase complete parts processed to your exact specifications.

Special equipment geared to handle both long and short production runs assures maximum efficiency and economy. Send sample, blueprint or description for prompt quotation and delivery.

Sold through selected industrial supply houses coast-to-coast!



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Industry at Work, continued

At Bone Engineering Corp., Glendale (Calif.), a special tank was installed for the electroforming operation which deposited nickel on the mandrel surface to a depth greater than $\frac{5}{8}$ ".

The mandrel-liner assembly then was exposed to sub-zero temperatures. Since aluminum shrinks

more than nickel at the same low temperature, the mandrel separated from the nickel coating.

The bolt then was removed and the two mandrel sections were withdrawn, leaving the perfectly-formed liner ready for installation in Douglas' Mach 6 wind tunnel nozzle.

SPACER SPRINGS AID ALUMINUM SHEET HEAT TREAT PROCESS

Spacer springs of die steel that minimize distortion in thin-gauge aluminum sheets during heat treating have been developed by



Clayton Ruud and Don Heinrich, manufacturing research engineers of the Boeing Aero-Space Division.

The springs are made of H-11 die steel and retain their tension through hundreds of heat treat cycles.

Inserted at both top and bottom of coiled thin-gauge aluminum sheets, the springs are first stretched to facilitate coil placement. Tension is then released to fix coil firmly for heat treat processing to the strength and durability required for high-performance aircraft.

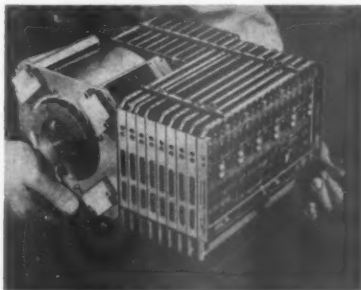
In several months of production, the springs have been found easy to apply and economical to use. The springs hold coiled aluminum sheets firmly in position when the sheets are placed on heat treat furnace racks. Space provided by the springs between the coils insures uniform heat distribution and quench-water circulation. The technique has resulted in improved quality and

reliability, with fewer rejections.

Best spring size for handling the aluminum sheets was found to be 8" and 1" outside diameter of .063 steel wire.

Use of spacer springs in this way has helped solve a thin-gauge aluminum sheet heat treat problem which has been troublesome in aircraft manufacturing. By restraining the coiled sheets during heat treating and, at the same time, preventing metal-to-metal contact, the spacer springs have helped to prevent warpage, weak spots, whip-lash damage and lowered mechanical properties. These occurred variously during development tests in which the sheets were suspended from overhead clamps or placed upright on heat-treat racks in loose or tied coils.

MINIATURE COMPUTER GUIDES CENTAUR ROCKET



A miniaturized, digital computer will be integrated with the Centaur guidance system. The computer was developed under a \$1.8-million subcontract awarded to Librascope, Incorporated, by Minneapolis Honeywell, developers of the Centaur's inertial guidance system.

The Librascope computer will accept inputs from the inertial platform, perform the necessary guidance computations, and pro-



Plymouth's XNR six-cylinder roadster features an air scoop which continues back through the entire length of the car, becoming a functional single fin on the driver's side. The frame for the grille is actually the front bumper.

vide steering signals to the Centaur control system. Silicon-transistorized throughout, the digital computer is immune to a wide range of environmental extremes. Weight of the computer has been reduced to 32 pounds, and it occupies only 0.55 cubic feet of precious space inside the missile.

Prime contractor on the NASA sponsored Centaur program, which has the designed ability to place a 730-pound payload on the Moon and to send instrumented space research and communications satellite into orbit from 300 to 22,000 miles, is Convair Astronautics Division of General Dynamics.

The Centaur consists of a modified Atlas first stage rocket coupled to a 15,000 pound thrust, liquid oxygen and hydrogen second stage under development by Convair and Pratt & Whitney. Jet Propulsion Laboratory will develop the third stage liquid engine.

KODAK BOOSTS WATER SUPPLY TO 36 MILLION GAL.

A new chemical treatment tank being completed this spring will bring water capacity of Kodak Park, Eastman Kodak Company's largest manufacturing plant in Rochester, N.Y. to a new high of 36 million gallons per day. Six rapid sand filters will complement the huge basin.

The fourth tank to be installed at the treatment plant on Lake Ontario is 60 feet in diameter and 19 feet deep. Water direct from the lake is chemically treated to remove bacteria, turbidity and some color. After sand filtering it is about as pure as it can be made and ready for the making of photo film and paper. •

It's the "little things" that pick the corporate pocket

IT'S the mark of a good executive to delegate authority. "Don't run a one-man show," the experts say. It is also the mark of a good executive to backtrack occasionally and check up on the results of delegated authority — particularly in those areas that may seem to require little executive judgment. These are the "little things" — *that count*.

Take, for example, the purchase of hand tools — wrenches, screwdrivers, impact sockets, pliers, etc. used on the production line or by the maintenance department. Just a routine buying job. You can pick 'em up anywhere — cheap.

But are they cheap? Poor-fitting tools cause accidents. Accidents cost money. Cheap tools damage screws, nuts, expensive parts. More cost. Cheap tools break easily, mean wasted time going back to the tool crib. More cost.

And with cheap tools, that's all you get — cheap tools. No advice, no benefit of an experienced sales engineer's tool and tool-use knowledge.

May we cite just a couple of examples of how top-quality SNAP-ON® tools sold by a SNAP-ON specialist saved these companies time and money.

Case A.

Impact sockets. SNAP-ON sales engineer inspected production line, suggested testing SNAP-ON power impact sockets along with brand then in use. *Result:* SNAP-ON sockets costing a few cents more handled ten times the work before showing wear. The company switched to SNAP-ON sockets, reports substantial savings.

Case B.

Tool kit for electronic assembly. SNAP-ON sales engineer inspected production line — recommended a special selection of tools to be purchased by employees. *Result:* There was such an improvement in work quality and output among SNAP-ON kit owners that the company arranged for every production employee to have a kit.

SNAP-ON Tools Corporation can cite hundreds of cases just like these, where qualified tool specialists recommended standard or special tools that resulted in faster production, greater safety, better work.

Perhaps hand tool purchasing is one of those "little things" that you or one of your associates should look into. If so, SNAP-ON would be happy to have a representative call and go over your hand tool program. Tools are a SNAP-ON representative's business — his only business. He can help you save money. Call your nearest SNAP-ON branch or write us, outlining your problem.



SNAP-ON TOOLS
CORPORATION

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Popular 5040T now available with...

Detachable - TORQUE CONTROL BARS

make this a one-tool assembly line...



Size 5040TD
AIR IMPACTOOL
An I-R Exclusive

Ingersoll-Rand's reliable, job-proved, built-in torsion bar torque control Impacttools have paved the way for these new *Detachable* torsion bars. The popular 5040T Impacttool is also available as the 5040TD, an ideal tool where limited production does not warrant the cost of several Impacttools with built-in torsion bars.

Here's the economical answer to better quality control on fastening jobs that require different torques for the various nuts or cap screws. Now you can have a series of detachable bars, preset to the specific torques you require.

For example: slip on the 40 ft. lb. bar and run those three nuts—slip it off—put on the 50 ft. lb. bar and run the six cap screws—next the 30 ft. lb. bar, and so on. The Impacttool shuts off automatically at each preset torque—quality control at its best.

How do you get it? Order a new Size 5040TD Impacttool which has the built-in automatic shut-off device that is actuated by the preset torque control torsion bar. Then order as many torsion bars as you need. You can set the torque yourself with a vise and a wrench.

The Heavy-Duty bar is adjustable from 45 to 90 ft. lbs. The Light bar provides torques from 20 to 50 ft. lbs.

Don't wait; phone or write today for a demonstration or a copy of Form 5298.



Ingersoll-Rand

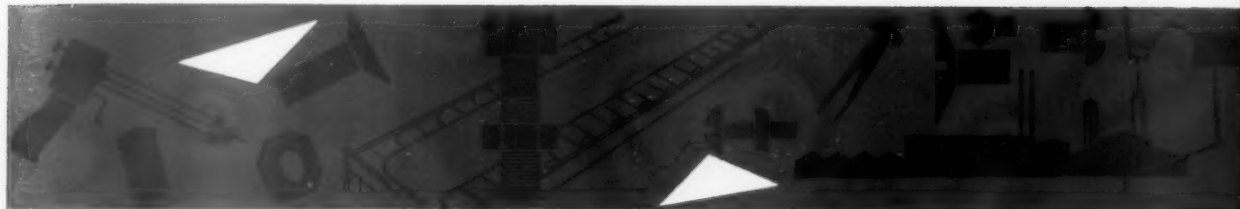
11 Broadway, New York 4, N. Y.

Planned Annual Retooling
increases output per man

36A-8

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Assembly and Fastening Ideas

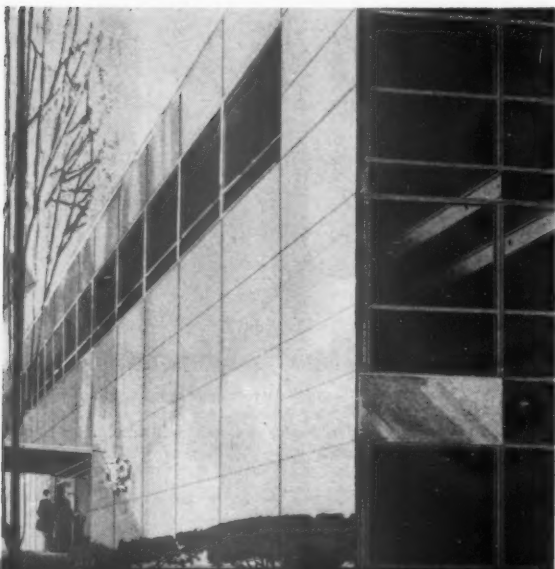
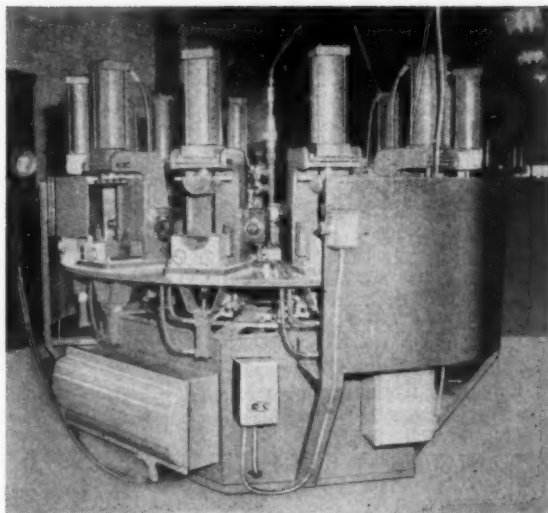


AUTOMATIC MACHINERY SPEEDS BONDING

Resin, heat and pressure combined with automatic machinery produces "hotshot" bonding, a technique making a significant contribution to industrial assembly operations.

The variable-speed bonding machines will permanently join metal, rubber, plastic and other similar or dissimilar materials to each other. The process was developed by the Spanich Bonding & Welding Corp., Livonia, Mich., whose specialty is bonding brake linings and transmission bands for automotive equipment, clutches and brakes for industrial presses and off-the-road construction equipment.

The automatic machine bonds more than 800 work pieces every hour. Similar equipment recently bonded friction material to a 96" clutch plate for a forging machine. Previously, the same job required 1284 rivets.



HOW FASTENERS AID PANEL WALL ERECTION

Efficient fastening methods are contributing to the popularity of a new panel wall system as a quick-erecting, low cost structural design.

Stran-Wall, manufactured by National Steel's Stran-Steel Corp., features colorful porcelain curtain wall panels that slip into place on a lightweight steel structure.

The steel framing is load-bearing, which eliminates the need for heavy structural beams and columns. Framing is easily assembled by welding or with self-tapping screws. Panels slip into slots and grooves in the framing itself. A nailing groove in the framing makes it simple to attach collaterals to the exterior or interior walls. Additional floor space results from a thin wall free of boxed columns.

continued

Precision to:
+ .0002
- .0000



Stainless Steel PINS in STOCK

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IMMEDIATE SHIPMENT

DOWEL PINS

(precision tolerance)

- Stainless steel 18-8, type 303
- Diams: .0312 through .500
- Lengths: 3/32" through 2 1/2"
- Chamfered ends
- "Specials" manufactured promptly
- Full range raw material on hand

TAPER PINS

(commercial, precision, AN)

- Stainless 18-8, type 303. Also many in type 316 (Commercial tolerance)
- Size: 9/0 through 10 in stock
- Lengths: 3/16" through 8" (not all lengths in all sizes.)
- "Specials" manufactured promptly, any material

PLUS all types and sizes of screws (slotted, Phillips—both magnetic and non-magnetic—hex, socket), bolts, nuts, washers, rivets, nails, keys, etc.

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Manufacturers of Stainless Fasteners Since 1929

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West Coast Division—Office and Warehouse
5822 West Washington Blvd., Culver City, Calif.
Phone: WEbster 3-9595 TWX LA 1472

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Assembly & Fastening Ideas, continued

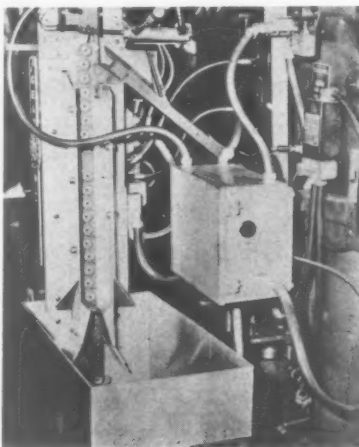
Aluminum mullions, jambs, sills and headers are designed to be snap-fit or attached by concealed screws to the structure. Other design features include positive water seal and ventilation to reduce condensation, thin-

line mullions and a choice of hopper, fixed or projected windows. Mullions are made of anodized aluminum alloy.

The company also manufactures a complete line of architectural steel products.

AUTOMATIC LOADER FOR RIVETER PROTECTS OPERATOR

A new automated orientor-loader and locator provides increased production of paint cans while greatly improving worker safety on a battery of riveting machines. The equipment's specific purpose is the automatic feeding, positioning and riveting of paint can bail-holding ears, mak-



Note that correctly positioned ears are almost horizontal and centered on belt. Improperly spotted ears are dropping back into hopper.

bottom of the belt and are carried upward.

As these "held" ears enter the middle, weaker field, those improperly positioned or oriented drop back into the hopper. Correctly situated ears rise to the top of the belt where a mercury switch activates a cylinder-type "kick-off", ejecting ears into the river feed chute.

At the bottom of the feed chute, the ears are "fingered" onto the can which has been placed in position by the operator. The fingers are operated by a cylinder activated by a foot switch. When the ear is in position, the fingers retract leaving the ear in position, and a ram rivets both sides of the ear automatically. The operator then turns the can a full 180° until the first ear settles into a recess in the support saddle underneath. The can is thus automatically positioned to receive a second ear exactly opposite the first. The foot switch then activates the second riveting operation.

The Gear-O-Mation-designed machine handles up to 1400 rivetings per hour, or 700 cans.

ing it unnecessary for the operator to endanger his hands or fingers. The machine has previously been equipped only with automatic feed for the rivets.

The ears to be riveted are placed in a hopper-type bin from which a continuous impregnated canvas belt rises. The belt passes over north and south pole steel bars placed parallel to and behind the belt. These steel bars are spaced apart by Alnico rods which transfer their magnetic field to the steel bars. By varying the spacing between the centers of these rods, the magnetic field can be strengthened or weakened. Thus, there is a relatively weak field of attraction near the center of the belt. Ears are attracted in clusters to the strong field at the

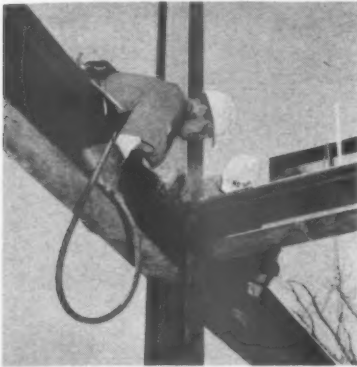


Operator places can in position and trips foot switch, ejecting ear from load chute onto can. Hands are kept well outside of riveting area.

Assembly and Fastener Engineering

HEX BOLT FASTENING CUTS CONSTRUCTION TIME, COST

Power wrenching, although possible with square fasteners, is more practical with hexagon shaped bolts and nuts. Because a hexagon wrench socket is smaller and fits over the nut more easily, it virtually seats itself when the wrench is started. Since a square



Power wrench is readily used even in very tight spaces as in this in-the-beam double connection. Where necessary, chuck extension may be used on wrench.

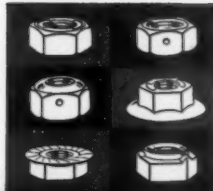
socket must be positioned by hand before wrenching begins, power equipment often is not used with square fasteners.

In erecting buildings joined with hex machine bolts, New England Iron Works follows the usual procedure of fitting up the joints with one or two bolts and then plumbing the structure. An iron worker then installs the remainder of the bolts, putting the nuts on with just a few turns. A two-man team follows with a power wrench.

New England Iron Works uses the same equipment for tightening the hex machine bolts that it uses for structures erected with high tensile bolts except that torque-controlled wrenches are not necessary. No torque is specified for tightening machine bolts in building erection; the only requirement is that connections be joined tightly.

In a typical job savings in time have added up to about 10 man hours per 1000 fasteners. In the erection of a new science building at Bridgeport, Conn., University, RB&W "Hex and Hex" fasteners were installed with an estimated saving of 75 man hours. The building was a simple structure except for many in-the-column double connections. •

One

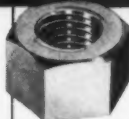


of these

CAN IMPROVE YOUR PRODUCT...

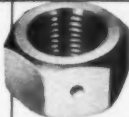
SIX GREAT **MACLEAN-FOGG** LOCK NUTS

MF UNI-TORQUE



A free starter with lock at the top. Withstands severe vibrations. Cuts assembly time.

MF TWO-WAY



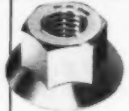
The Lock's in the center of nut. Can be applied from either end. Permits bolt end to be flush with, or below, top of nut.

MF OPEN END CAP NUT



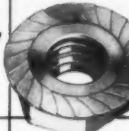
Has two-way center-of-nut lock. Used on furniture, appliances, toys, lawn mowers, tools, etc.

MF UNI-TORQUE FLANGE NUT



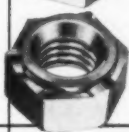
Combination lock nut and washer. Use on oversized holes; where extra bearing surface is needed.

MF "WHIZ-LOCK" FLANGE NUT



This one spins on. Serrations take a firm grip on work. Break loose torque higher than seated torque.

MF PILOT TYPE WELD NUT



You can have it with or without lock. Simplifies assemblies by means of self-locating pilot.

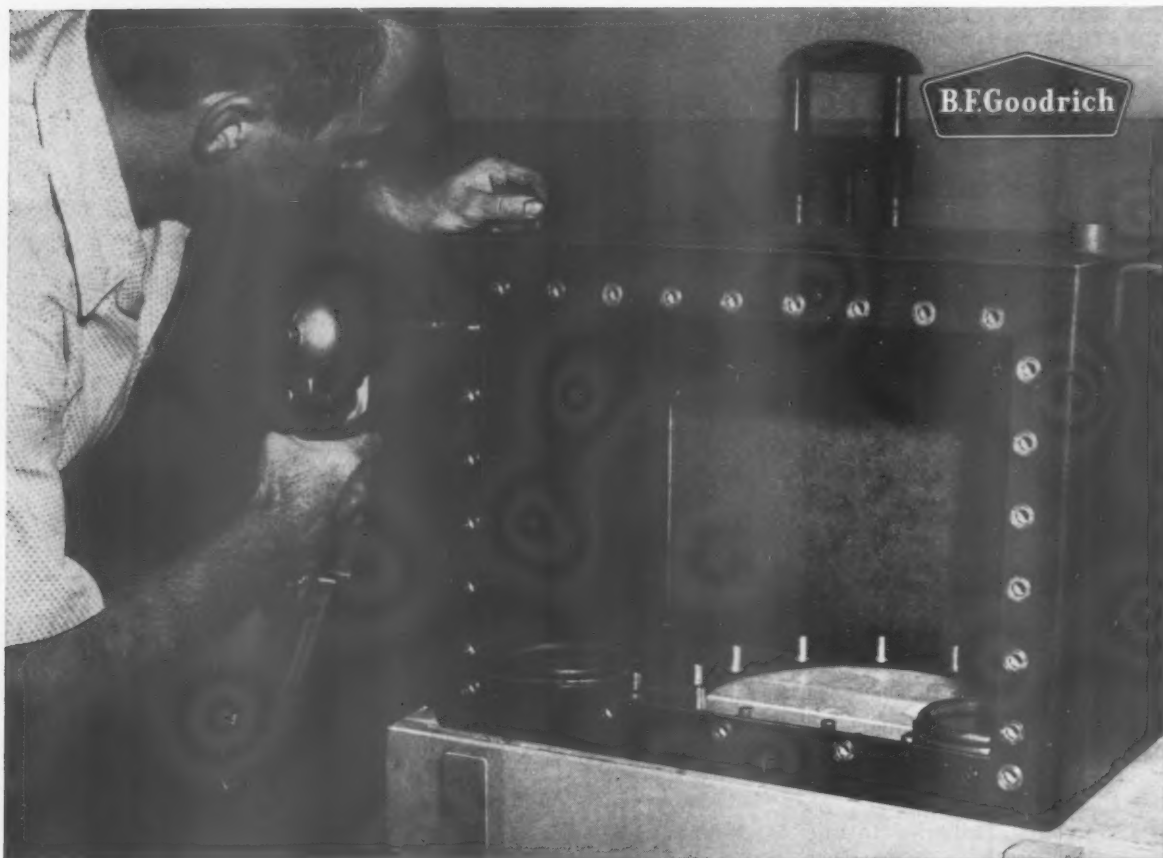
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MacLean-Fogg Lock Nut Company
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1925 **35** 1960
ANNIVERSARY



RIVNUTS® streamline tank design; eliminate damage to product

This oil reservoir, fabricated by Stolper Steel Corporation, Menomonee Falls, Wisconsin, for a husky new Allis-Chalmers tractor-shovel, requires removable cover plates. This is accomplished with flush-mounted RIVNUTS and threaded bolts.

With RIVNUTS, all possible damage is eliminated, since the RIVNUTS project inside the tank. Installation is simple: holes drilled and countersunk, RIVNUTS upset with a heading tool. Flush installation permits obtaining a liquid-tight joint without grinding.

RIVNUTS are the only one-piece blind rivets with internal threads. If you'd like recommendations on a specific fastening problem, please send a print of your part. For descriptive bulletin, see Sweet's Product Design File, or write *Dept. AF-5, B. F. Goodrich Aviation Products, a division of The B. F. Goodrich Company, Akron, Ohio.*



B.F. Goodrich Rivnuts

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REPORTS FROM THE FIELD



WIRE INSERTS MOLDED INTO PLASTIC CARBONATOR CAP LICK FASTENING PROBLEM

High internal gas pressures in conjunction with limited space for boss areas on the plastic cover of a new lightweight beverage carbonator provided an interesting fastening problem for engineers



Molded cap and base is joined to cylindrical chambers by simple solvent-welding process. Molded insert in conjunction with O-ring fitting provides a positive seal that has withstood pressure tests up to 500 psi.

of Yan-Nell Industries, Newark, N.J., whose product operates without water pump and electric motor.

Eight threaded fittings in the carbonator cover required a gas-tight assembly that would handle intermittent working pressures of 150 psi. Occasional engagement and disengagement of the CO₂ and water lines also required durable threaded connections.

A limited area on the cover of the unit as well as the high cost of machining a special stainless steel or bronze insert eliminated the use of solid bushings.

The problem of getting enough thread strength to provide a gas-tight connection and one that would also resist thread water in the relatively soft butyrate was solved by molding wire thread inserts directly in the carbonator cap. Pipe thread fittings were also eliminated and positive sealing accomplished with a composition

O-ring in the connection fittings.

Two stainless steel molding inserts are used in the inlet side of the unit, another for the water inlet fitting. On the discharge side of the carbonator, two inserts reinforce the carbonated water outlet and a relief valve. Two inserts are used for the CO₂ gas inlet.

In conventional applications of Heli-Coil wire thread inserts, a hole must be first drilled and tapped before the insert can be installed. All three steps have been eliminated by placing the inserts in the mold before the forming process.

First, the molding inserts are placed on a thread loading stud and placed in the top half of the stainless steel mold. The mold is assembled and butyrate injected at 20,000 psi. After the mold is separated the insert loading stud is removed from the finished piece leaving stainless steel threads in the carbonator cover.

MACHINE GUARANTEES AIRPLANE FUEL LINE BRAZED JOINTS

Fuel lines for airplane engines require 100% brazed joints. To insure complete brazes, each joint is subjected to X-ray examination and those that do not measure up are rejected.

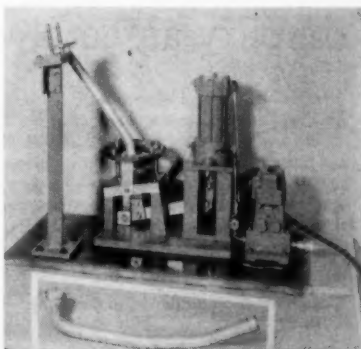
Conventionally, tubular joints have been designed for brazing with a wide overlap to compensate for the expected lack of complete alloy flow. Such joints can often be satisfactory in strength and tightness to pressure and/or vacuum. But when examined by tests to destruction, or by X-rays, too frequently it is found that the diffusion of the alloy into the joint surfaces was only partially

accomplished. Voids or islands readily show up that were not visible to the eye.

The aircraft industry and several of the airlines approached Induction Heating Corporation to learn whether equipment could be designed that would guarantee brazed joints, and on a production line basis.

After experimentation, a method was perfected: Surfaces of the joint are first chemically cleaned. Flux then is applied to all surfaces to be brazed. An alloy ring is placed over the tube and rests on the coupling.

The assembled joint is then



placed over an expanding mandrel and surrounded by a work coil. The work coil is energized; the coupling is heated and ex-

continued



Industrial
Series 1000 —
External rings



Industrial
Series 2000 —
External rings



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Series 3000 —
Internal rings



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Series 3100 —
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simplify assembly

Precision-engineered INDUSTRIAL Retaining Rings . . . internal, external and open types . . . are available in a wide selection of sizes and finishes. Solve your fastening problems simply and economically with the rings that cut machining and tooling expense, save material, simplify and speed assembly. Series 1000 and 2000 are available stacked for quickest application.

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Field Reports, continued

pands, (it is closer to the work coil) permitting the alloy to flow into the joint capillary. When the alloy in the joint reaches a temperature of maximum "wetting" properties, the air cylinder operates and forces the mandrel to the tube walls. This expands the tube against the coupling and spreads the alloy uniformly throughout the joint area. At the moment the mandrel has expanded the tube, the work coil is de-energized. (The mandrel itself is made of

titanium because that metal cannot be brazed by silver alloy).

Still under cylinder pressure, the joint is allowed to cool. All joints are then X-rayed to determine whether the alloy has covered the entire surface.

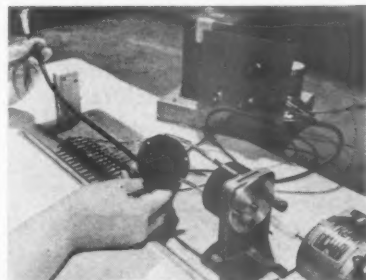
The complete fixture is easily accommodated on a standard work-table, and the same work-table can be adapted to take a variety of fixtures that will accept different shapes of fuel lines.

ADHESIVE SOLVES ELECTRONIC PART FASTENING PROBLEM

Increasing pressure for instrument miniaturization has given rise to many assembly problems.

Take the case of a shaft position digital encoder which the ASCOP Division of Electro-Mechanical Research, Inc., Princeton Junction, N.J., is now supplying manufacturers of computers, telemetry and other remote control devices and data processing equipment. The device measures 2 1/4" in diameter and 1 1/4" thick. It converts directly into electrical binary code impulses, machine tool carriages, the shaft position of self-balancing potentiometers and radar antennae.

ASCOP managed to pack the necessary mechanical and electrical components into the compact housing, but an unexpected complication arose—how to attach the plastic insulating sleeve containing the output circuit wires to the cover plate of the housing. This had to be done without em-



Aluminum cover plate with polyvinyl tubing attached is installed on a shaft position digital encoder. Encoder is mounted on test frame.

ploying a connective device which would protrude into the housing.

In considering the use of an adhesive, engineers were faced with the problem of permanently bonding two dissimilar materials: polyvinyl chloride (the sleeve), and anodized aluminum (the cover plate). Eastman 910 was recommended. This high-strength adhesive forms rapid bonds with a wide variety of materials and does not require a catalyst, evapo-



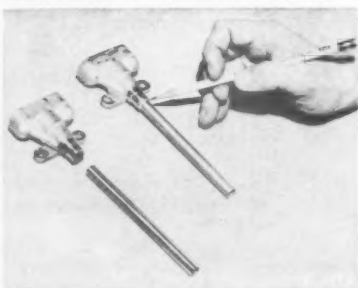
A polyvinyl plastic tube is bonded to the aluminum cover plate of shaft position digital encoder. Plate with inserted tubing is positioned on jig and adhesive applied. Flaring tool forces the end of tube back against plate.

ration of solvents, or more than holding pressure.

In assembly, the housing cover is placed on the holding plate of a small toggle jig and the plastic tubing is inserted through the cover so that it protrudes slightly. The protruding portion of the tubing and the area of the cover plate immediately surrounding it is cleaned by wiping with a small quantity of nitromethane solvent after which a small quantity of the adhesive is applied. A Teflon tool attached to a toggle device flares and flattens the end of the tubing against the cover plate. Within two to three minutes a bond stronger than the plastic is formed.

It should be noted that because of the almost universal nature of the adhesive, it is necessary to coat the Teflon tool with silicon grease to prevent any excess adhesive from bonding the tool to the vinyl tubing.

BRAZING HOLDS COMPONENT ALIGNMENT TO .007" F.I.R.



Fine, neat joint is achieved in this thermostat body, and tube brazed assembly. Alignment of the two components is held within .007" final indicator reading.

Close control of brazing temperature and cycle in a controlled atmosphere produces component alignment and concentricity within .007" final indicator reading in a thermostat body and tube assembly.

The assembly is used to control the flow of combustion gas in a gas turbine and operates in an ambient temperature of approximately 1000°F. It consists of a Type 347 stainless steel investment casting body and an L-605 alloy tube. The assembly is brazed using standard Microbraz brazing alloy in a pure dry hydrogen furnace at 2150°F in the Monticello, Calif., plant of Wall Colmonoy Corporation.

YOUR FASTENING PROBLEM MAY NOT BE TOO SMALL TO AUTOMATE WITH NATIONAL RIVETING EQUIPMENT

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FOR YOU!**

1 LEASE

(Where a capital investment is not desired)

2 PURCHASE

(Where the nature of the product and volume of riveting makes purchase the most economical method)

EACH SERVES A SPECIAL PURPOSE

One may be just the ticket to make automated fastening with National Semi-Tubular Rivets possible for you.

Automated fastening does not necessarily mean thousands upon thousands of dollars in multi-headed riveting machines.

In fact, over 90% of the riveting machines in use today are low cost, single riveters which are easily converted to new jobs and new products as they are developed.

Don't hesitate to ask National about your fastening problem. It's a matter of record that National has very seldom had to turn away a potential user. In almost every case National has demonstrated exceptional savings in manpower, time, costs, and provided fastening qualities equal or superior to those replaced!

WRITE NOW. Send a blue print or the actual fastening job. You'll get the prompt attention you want.

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*Presenting examples of
how custom fasteners are used
in products from toys to television*

WHEN AND WHERE TO USE

The production of custom fasteners is a highly specialized and technical science requiring both engineering and manufacturing skill. A fastener "to fit" a specific application often requires special designing within the broad categories of various fastener types, e.g., screws, rings, nuts, pins, inserts, rivets, washers, etc.

Because of special design requirements or limitations, the standard or proprietary products in the fastener field may not be able to fill specific functions required in a particular application. Or standard fasteners may not be available, or cost reduction may be a factor. In a word, the job is special, or custom.

The custom fastener requires special handling in design and manufacturing to make it suitable to the holding application. The use of such fasteners is extremely broad in scope and infinite in number. New designs are being developed daily.

In designing custom fasteners, the function of the part is usually the primary consideration. Space limitations, unit cost reduction, dual or multiple applications, automation, machining, etc., may also be important factors.

In any case, the experience of the designer in this specialized field can make the difference in the practicality of the fastener and the economics of its production.

Materials and finishes also play an important part. All materials from low-carbon cold-rolled steel to heat resistant stainless steel and decorative non-ferrous alloys are used, depending on the cost of production. The following chart provides a guide for choice of material. It shows maximum temperatures at which commonly used materials will function without losing inherent spring properties.

Material	Permissible elevation temperature*
Brass	150° F
Phosphor Bronze	225° F
Music Wire	250° F
Beryllium Copper	300° F
Carbon Spring Steel	375° F
Alloy Spring Steel	400° F
Monel	425° F
K Monel	450° F
Z Nickel Type B	500° F
Stainless Steel 18-8	550° F
Stainless Steel 17-7PH	650° F
Inconel	700° F
Inconel X	850° F

*Note: Loss of load less than 5% in 48 hours.

The choice of finish is also dependent on the application. Both organic and inorganic coatings can be applied to provide protective as well as decorative qualities. A wide choice of finishes is offered in the

following table which provides a guide for more common applications:

Finish	Application
Nickel Plate	Used primarily for decorative purposes. Has limited corrosion resistant properties.
Zinc or Cadmium Plate	Has good corrosion resistant as well as limited decorative properties. If applied to spring steel must be baked after plating to remove hazard of hydrogen embrittlement.
Zinc or Cadmium Plate with supplementary passivation (Iridite or Chromate)	Improves corrosion resistant properties by protecting plate from oxidation. Treatment can be clear or colored.
Chrome, Copper and Brass Plate	Used primarily for decorative purposes.
Phosphate with supplementary coat of oil, wax or lacquer.	Has medium corrosion protection but no hazard of embrittlement.
Oxide Black	Poor protection but can be improved with oil, wax or lacquer.
Organic Finishes	Good color match possible but protection not as good as electroplating.

Heat treating procedures play an extremely important part in the fastener field. Because of the versatility of equipment and experience of custom fastener manufacturers, the correct procedures can be engineered for the ultimate application. The following examples of the design and use of custom fasteners show the broad range of applications and the diverse types of fasteners used. They are illustrated in this article and identified by letter.

(A) A toy manufacturer required a multiple function fastener designed for assembly line installation to provide a linkage as well as spring action for sound control. A one-piece fastener served all three functions. The fastener activates the bellows that makes this toy cow "moo."

(B) A television and radio company wanted a fastener for quick semi-automated assembly of knobs yet providing for ready removal of the knob in the field. A custom fastener designed in strips was the answer. The pre-assembly of the knob and fastener was speeded up because the operator no longer had to handle or orient individual pieces.

(C) A manufacturer of industrial carpets had a blind assembly problem. The carpet was framed by an aluminum extrusion fastened to a second extrusion fastened to the floor. It was necessary for



by **F. R. Downs, Jr.**
Vice President
Stanley-Humason, Inc.

CUSTOM FASTENERS

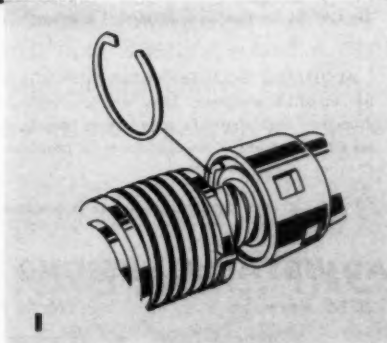
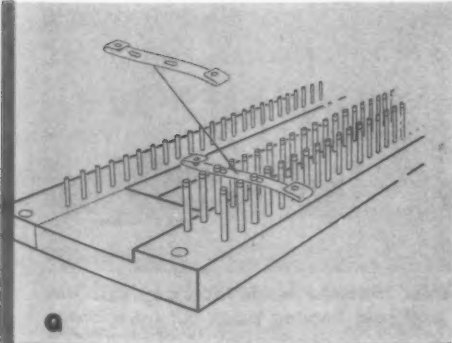
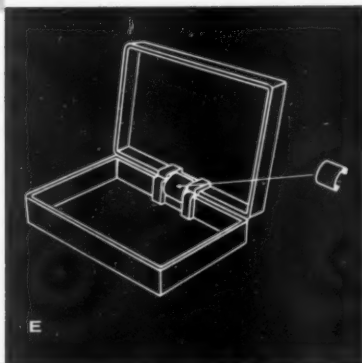
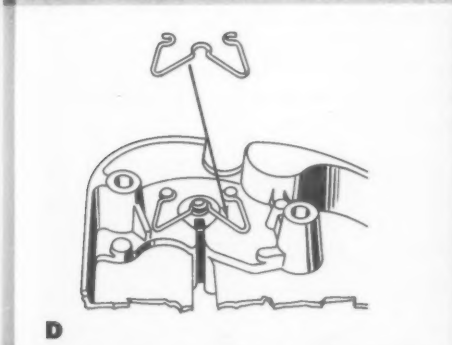
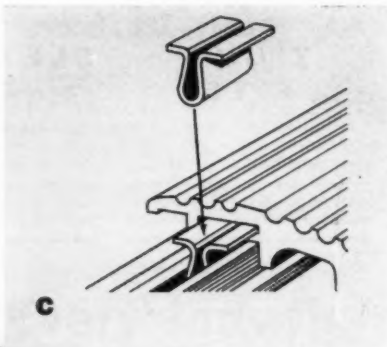
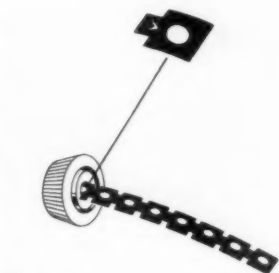
field service personnel to be able to readily disassemble and reassemble. The fastener had a dual function of providing necessary holding power against vibration and traffic yet allow for necessary field service.

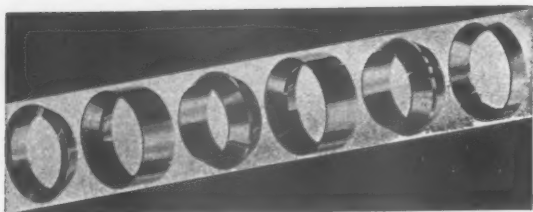
(D) An electrical components manufacturer had a problem of holding an adjusting screw so it was vibration-proof yet could float into alignment with other parts. The fastener, as in most other cases, had to be easy to assemble as well as self supporting.

(E) The packaging industry makes extensive use of a fastener known as a "C" spring because it is easy to assemble, compact in design, eliminates hinge components, and provides positive opening as well as closing.

(F) The lighting industry required a quick but positive means of locking a lamp base in industrial fixtures. The solution was a three prong fastener with built-in tension to provide the necessary anti-vibration feature.

continued

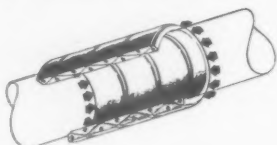




Precise Cylindrical Fits

are now easily obtained with

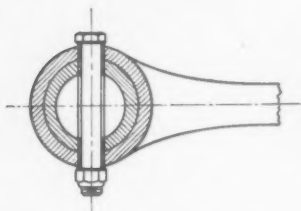
ADJUSTABLE WALL-THICKNESS BUSHINGS



When an axial compressive force is applied, male bushing segments are forced in toward the center which reduces I.D., while simultaneously, the female segments are forced out to a larger diameter increasing the O.D. of the bushing.

TIGHT FITS

In extensive testing conducted by a major aircraft firm ADJUSTABLE WALL-THICKNESS BUSHINGS substantiated their ability to provide tighter structural joints than those assembled with taper pins. A resume of this testing is available. An air-

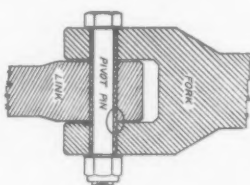


borne application now has military approval.

Bushings not only provide tighter structural joints, but greatly simplify the fabrication of such joints. Only loose tolerance drilled holes are required; no reaming on assembly. Further, interchangeability of attached parts is maintained since there is no need for reaming a matched tapered hole on assembly.

CLEARANCE FITS

ADJUSTABLE WALL-THICKNESS BUSHINGS have repeatedly demonstrated their ability to provide extremely precise clearance fits by means of simple mechanical adjustment, thus eliminating much expensive close tolerance machining,



while providing superior fits. For example, a requirement of one of our customers for a fit of not less than 10 millionths clearance, nor more than 50 millionths clearance was quickly and inexpensively obtained with ADJUSTABLE WALL-THICKNESS BUSHINGS. With a simple mechanical adjustment, they repeatedly compensate for wear in such fits, thus effecting extensive additional savings.

ADJUSTABLE WALL-THICKNESS BUSHINGS are easily installed by unskilled workmen. They are available in a full range of diameters and lengths in a variety of ferrous, non-ferrous and non-metallic materials. Your cylindrical fit problems earnestly solicited.

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When To Use Custom Fasteners, continued

(G) A custom fastener was successfully used by a piano action manufacturer to perform multiple functions. The bayonet lock provided for a quick yet positive assembly. Spring steel afforded the necessary spring action as well as holding adjusting screws in a vibration-proof position.

(H) One manufacturer had a problem of positively locking a piece of tubing in a cast housing yet allowing for release with finger tip pressure. Both conditions were satisfied by pre-forming a ring stamped from spring steel to provide the necessary locking medium.

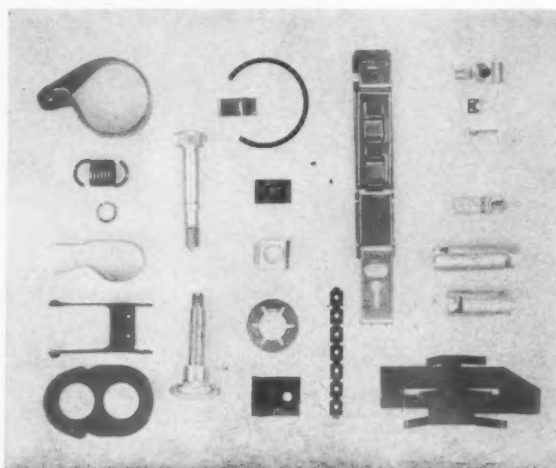
(I) Many internal and external retaining rings combine fastening with other functions. In one case the ring not only held two components securely but also provided for thrust compensation. In another, they not only held two members together but also provided a bearing surface enabling the two parts to index. Many rings have incorporated in their design assembly and disassembly aids and in some cases can be either packed or stacked for magazine feeding.

HAIR PINS AND GARTER SPRINGS

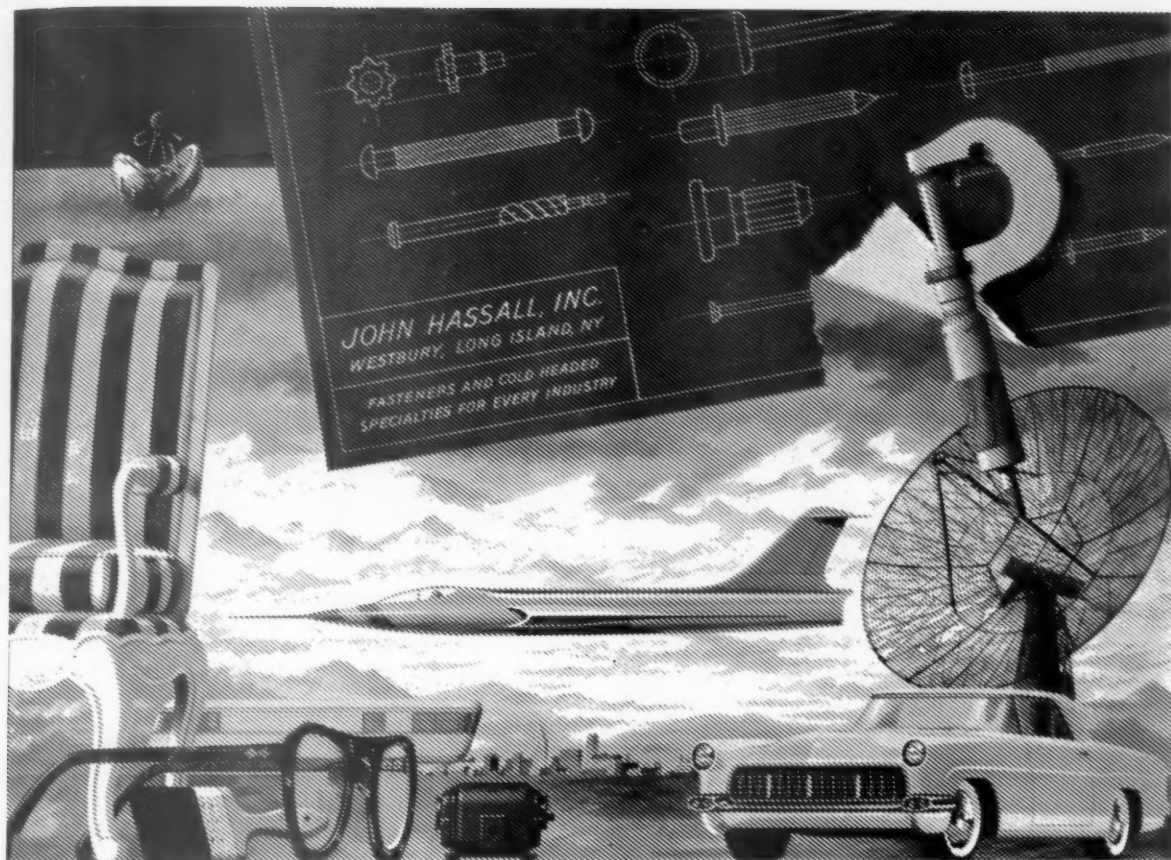
A fastener which is flexible in application, easy to assemble and disassemble is the hair pin type. A good lead facilitates assembly, adequate material prevents settage and because of the loop it is readily disassembled. Relatively inexpensive tooling can provide the right design for the right job.

Another common fastener is the garter spring which requires special engineering to the application. A popular use is providing uniform pressure around the entire circumference of a shaft as well as compensating for wear in such assemblies as oil seals or sprag clutches.

A wide range of industries such as automotive, appliance, aircraft, electrical, toy, packaging, electronic, hardware, tools, to name a few, are served by the custom fastener field.



Shown are custom fasteners made as stampings, wire forms, springs and cold headed parts. All were custom tailored to specific holding applications.



Job-Designed Fasteners for Every Industry



Here is a fast, dependable, low cost, quality minded source of supply for JOB-DESIGNED fasteners of all types, in any metal, to fit your own particular assembly problem. Recognize the fact that a fastener designed specifically to fill a seemingly complex assembly requirement can easily cost less than design modification to accommodate so-called standard rivets. Assembly costs are a very major part of manufacturing expense. Most of this is labor. The fastening medium itself is usually a minimum item. If a Job-Designed fastener makes assembly simpler and faster, permits the use of fewer fasteners, allows the designer functional freedom and

improves product efficiency, yours is a purchasing job well done. All these possibilities are available when you come to Hassall for design assistance and quotation on challenging, difficult or unusual rivets, threaded nails, drive screws and other cold headed parts. Short or long runs, pilot quantities, engineering counsel, over 100 years of intimate association with cold heading—and a deep appreciation and regard for the concept of value analysis—all are a part of the Hassall service to you.

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A discussion of rotary and percussion type
air-powered fastening tools, including such factors as
operating costs, flexibility and maintenance

THE ECONOMICS OF PNEUMATIC TOOLS

The uses of pneumatic tools in assembly operations are many and varied. New uses are being discovered almost daily as production capacity expands and as faster, more economical means of producing goods are found.

This discussion of a few representative pneumatic fastening tools will review their power-to-weight ratio, operation, dependability, safety, cleanliness, flexibility, maintenance, and operating costs.

The more common pneumatic power tools used in assembly operations may be divided into two general classes: percussion (hammers, riveters) and rotary (screwdrivers, wrenches, nutrunners). The former class utilizes an air cylinder for striking a blow, while the latter employs a reciprocating-piston air motor to drive a spindle, from which power is taken for the pneumatic tool.

Pneumatic tools may also be classified as devices to tighten unthreaded (rivets) and threaded (screws) fasteners. In both cases, however, the tools work on the same basic principle—the striking of a blow or a turning motion.

A random group of personnel engaged in assembly operations will usually have one person who is inclined to view the process as trivial and concerned with only a few screws, bolts, and nuts—in short, “penny-ante stuff.” With industry buying fasteners at a rate of about a billion dollars a year, this is quite a short-sighted view. With the effort to curb inflation and hold the cost line, both fastener and installation costs are of prime importance to both large and small companies.

The cost of fasteners themselves is but a small part of assembly costs, labor in assembly operations being usually three to four times the price of the fastener. It is in the area of cutting costs by speeding up production of assembled products that compressed air serves its users well. Other factors examined by purchasing, design, standards, and quality control personnel also play a part. But once such parameters as type and size of fastener, thread class, materials, and special assembly problems are worked out, compressed air can be relied on as a fast and economical means of driving or setting the fastener.

Of great importance under our present conditions of high labor and overhead costs is the almost static cost of compressed-air power. Analysis of the operational cost for a portable fastening tool will demonstrate that it is very low when compared to other costs. As an example, the air required to operate a heavy-duty pneumatic fastening tool costs less than 10¢ per hour, an insignificant figure when compared to the operator's hourly wage of perhaps \$2.50 per hour, and an overhead figure at about the same level. An estimate of the time required for a tool to pay for itself may be obtained from the following formula:

$$\text{Weeks to Repay} = \frac{\text{Cost of Tool}}{\text{Savings per Week}}$$

Assuming that total cost is \$150, labor and overhead costs \$5 per hour, and that a savings of only 10% is realized:

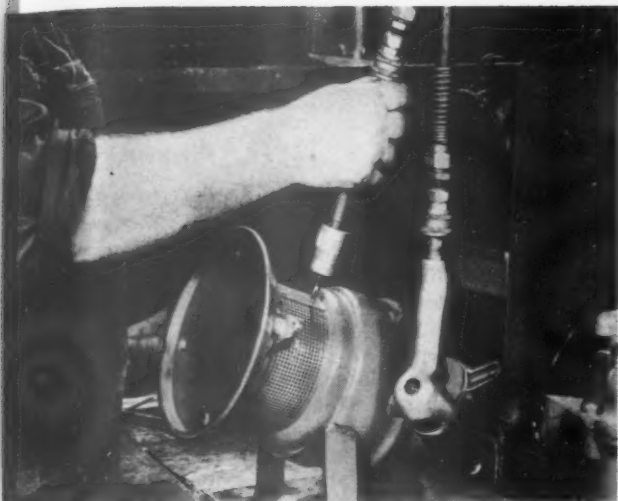
$$\frac{\$150}{\$5 \times 40 \times 10\%} = \text{About } 7\frac{1}{2} \text{ Weeks}$$

A saving in time (or money) of but 10% per week for a single worker has been assumed above, a comparatively conservative figure. Greater savings are possible if the factors of proper tool selection, correct line accessories, and operational pressures are observed.

Another benefit of compressed air is its safety—both for the protection of personnel, equipment, and the workpiece, and for use in explosive atmospheres.

To protect personnel and to prevent damage to either machinery or work during assembly operations, pneumatic power circuits on tools, holding devices, and similar equipment can employ fail-safe features. These devices are usually designed to operate either under conditions of mechanical failure or improper manipulation of controls by the operator.

Since air-operated devices are inherently rapid in action, the operator is protected by circuitry that may incorporate series hand- and foot-operated valves, both of which must be activated before the work cycle can begin. In a series arrangement pro-



Applications of portable air-powered tools are many and varied. They range all the way from a screwdriver used in applying screws to filter screen on pump (above) to a riveting hammer (right) used by the aircraft industry in the assembly of structural components.



tection is also assured if valves should stick in the operating position. One means is the provision of a pneumatic cycling-type circuit which requires that all valves be restored to the closed position before a new cycle can be started.

In holding the work during fastening operations, low air pressure can cause slippage—with possible injury to operator or damage to property. Holding devices, therefore, should be equipped with a means of failing safe (stopping the machine) when air pressure reaches a preset minimum safe holding value.

SCREWDRIVERS

Possibly the most useful of pneumatic tools in assembly operations are air-powered screwdrivers. These units can drive a screw in varying sizes in about one second. They are usable with all types of screws: machine, sheet metal, self-tapping, and with round, flat, binder, fillister, hex, and special heads. Pneumatic screwdrivers can be indispensable aids in meeting production schedules.

One type of screwdriver features a pressure-regulating valve that gives the operator such full control of the spindle stroke at all times that he can stop spindle movement in any position. The ease of pneumatic operation is thus combined with the control advantage of manual operation. Only two adjustments are necessary; once made, no further attention to the machine is required. First the regulating valve is set for maximum down-stroke when the control pedal is open. (Maximum down-stroke speed is determined by the type of screw being driven.) The second adjustment is in the exhaust control of the control pedal, which is set for as fast an up-stroke as possible without shock to the spindle when it arrives at the full-up position.

One new series of screwdriver is estimated to give

an annual dividend on payroll dollars of almost \$4,000 because of increased man-hour productivity. Multiplying this individual savings by the number of operators in a given assembly operation can result in an impressive increase in production (or dollar savings) at no increase in manpower.

SET-SCREW DRIVERS

A variation of the familiar screwdriver is a portable, automatic machine used to feed and drive set-screws. As many as 2,000 screws per hour can be carried by air from a hopper to the pneumatic gun. The gun may be placed at a distance from the machine—thus giving the operator considerable mobility in his work.

The operator's touch on the trigger cycles a selector that sends a screw through the delivery tube to the gun, which then inserts and drives the screw. The gun's torque or driving depth may be selected, with a clutch preventing overtightening of the screw. The speed at which the machine operates is governed by thread pitch and insertion depth.

HAMMERS AND RIVETERS

Air hammers are available in a wide variety of types and sizes. This group of fastening tools includes such operations as riveting and nail driving. The size, speed, and weight of the tool depends upon the use to which it is placed, and upon the size and weight of the fastener.

In a typical hammer-type tool such as a riveter, air enters the tool handle. A trigger controls a valve that governs the amount of air being introduced to the air cylinder. The valve admits air to the rear of the piston, throwing it against the rivet. After the

continued

blow, the piston is returned for another stroke by air admitted to the front of the piston.

One type of conventional long-stroke, high-power riveting hammer available is made in several sizes and with either pistol-grip or open handles. Strokes vary from 4 to 6½ inches and frequency from 1,450 to 1,100 strokes per minute, the power and frequency being adjusted by means of a knob that controls inlet air on each of the several models.

NUTRUNNERS

Nutrunners have proved to be of great value—in both assembly and disassembly operations. Heavy-duty types are available in speeds of from 350 to 1,300 rpm, and some have special right-angle attachments for use in confined spaces. Most modern tools have a built-in oil reservoir in the handle to provide automatic lubrication of rotors.

Available in both reversible and non-reversible types, nutrunners are compact tools that help the operator to turn out a maximum of work with a minimum of effort. The reversible models are adapted to removing nuts, and reverse their action simply at the touch of a switch.

Torque control of nutrunners or screwdrivers keeps torque variation within desired limits and decreases or prevents stripped threads, sheared fasteners, and spoilage of workpiece. The advantages

of torque control are of great importance in quality control procedures because this feature tends to eliminate product failures induced by distortion, loose sub-assemblies, stripped threads, uneven loads, and damaged fasteners.

IMPACT WRENCHES

An impact wrench consists basically of a rotating hammer that continues to drive the nut as long as contact is maintained. If there is no torque-control mechanism, torquing is dependent upon the workman's sense of touch and timing and his over-all experience on the job. By restricting the air supply, a fairly good degree of torque control may be achieved that is, to a large degree, independent of the worker's skill and experience. In this kind of tool, however, the operating speed of the tool must be slowed, thereby decreasing work output.

Air-powered tools can offer a big dividend to the volume users of fasteners. Pneumatic tools, used to drive screws, set rivets and tighten nuts, will permit greatly increased production at low cost to manufacturers engaged in assembly operations.

Available in a wide variety of sizes and capabilities, these fastening tools offer savings to both large and small operations—whether the tools be of the percussion or rotary type.

Fastener costs are small compared to labor costs in assembly operations, and it is in reducing the cost of labor that compressed air offers a big advantage to its users.



Three sectors of the tapered portion of the CONELOCK nut are preformed inwardly (Fig. 1). When the Nut is applied to a bolt, these conforming sectors are elastically returned to a circular configuration and create an inward and downward pressure which produces intimate contact between the load carrying flanks of the nut and bolt threads (Fig. 2). The shape of the cone sector displacement insures conformity with the mating bolt and maximum friction contact area. . . . The closed stress path in the locking portion of the nut and the advantageous distribution of locking pressure, produce a locking device of high fatigue life . . . and equivalent locking force is exerted at only a fraction of the stress of any slotted type locknut. CONELOCK main-

New One-Piece
"Cone Lok"
with prevailing torque



Fig. 1



Fig. 2

ains its locking action through many re-applications. . . . It is adaptable to high, and low torque assemblies . . . to high torque stop-nut applications . . . and may be obtained in sizes from No. 10 through 1½", Full and Thick dimensions are "Standard". . . .

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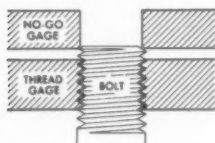


Technicalities

By Fred E. Graves

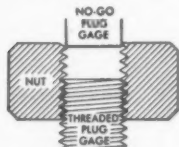
Proper inspection for screw threads

Thread inspection should answer two questions. (1) Will the threads allow easy assembly? (2) Is there sufficient thread depth for strength?



EXTERNAL THREADS

Strength requires sufficient thread flank engagement, which is checked by a minimum major diameter plain ring "no go" gage. Assembly is controlled by thread lead and maximum metal, which are checked by a threaded ring "go" gage.

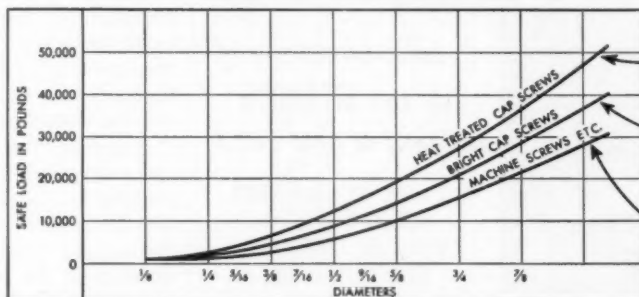


INTERNAL THREADS

The same reasoning holds true here. Use a threaded plug "go" gage to determine any interferences from thread lead or thread diameter that hinder ease of assembly. The unthreaded "no go" plug will assure proper thread depth for sufficient flank engagement.

Checking both thread lead and pitch diameter with two threaded "go" and "no go" gages not only increases inspection cost but also permits acceptance of pieces with insufficient thread metal.

How to simplify selection of fastener material



Safe loads for fasteners made from the three most common steel grades are shown on these curves. Curve for Grade 2 is smooth through the 3/4" size. There is no drop in proof load because RB&W fasteners up to 6" long are cold headed even in 1" diameters.

Basic job of a mechanical fastener is *physical*. It's designed to exert a clamping force.

Fasteners from a *standard* analysis of steel satisfy a majority of the usual requirements for this function. Most times, then, specifications should concern themselves solely with *physicals* for the job. Asking for certain chemical analyses to get the right *physicals* is doing it the hard way. It can create a needless cost penalty besides.

WIDE RANGE OF LOADS

Generally, the desired *physicals* can be delivered by a combination of cold working and heat treatment of one of the following common grades.

Grade 1 (or SAE 1010) steel goes into fasteners that offer a design load of 30,000 psi, such as carriage bolts and machine screws.

Grade 2 (or SAE 1018, 1020, 1021) steel goes into bright hex screws and similar items with a recommended design load of 40,000 psi in sizes up to 3/4". SAE proof load then drops from 17,350 lbs. in 3/4" size to 12,900 lbs. in 7/8" size *unless cold heading is specified!* This is because larger fasteners are often hot headed, resulting in some annealing. The strengthening effect of cold working is lost.

Grade 5 (SAE 1038) steel provides high strength heat treated bolts and hex screws with 60,000 to 80,000 psi design load range.

USE THE FULL INHERENT STRENGTH

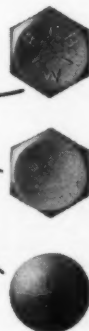
When calculated load on a fastener is below those values, you're wasting its strength and cost. Using the smallest size fastener consistent with the load, and tightening to its maximum load actually increases joint strength.

When you need an alloy steel because of space or weight or higher temperature or strength requirements, specifying *physicals* will automatically force your supplier to go to high alloy steel.

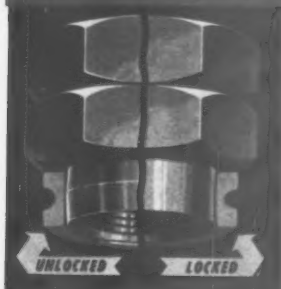
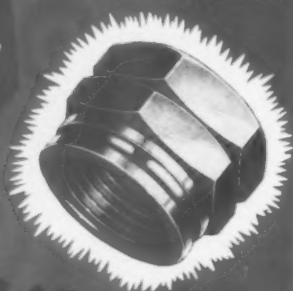
You will get what you need without selecting the exact alloy to be used. Just be sure you're served by a technically qualified and experienced fastener manufacturer.

Bulletin DC-2 gives other helpful hints. Send for it—or the RB&W Man. Russell, Burdsall, & Ward Bolt and Nut Company, Port Chester, New York.

Plants at: Port Chester, N.Y.; Coraopolis, Pa.; Rock Falls, Ill.; Los Angeles, Calif. Additional sales offices at: Ardmore (Phila.), Pa.; Pittsburgh; Detroit; Chicago; Dallas; San Francisco.



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PROVED**

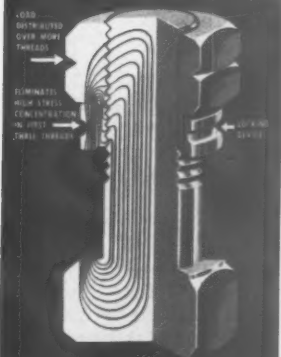


*... take advantage of
ALL the STRENGTH
designed in your bolt!*

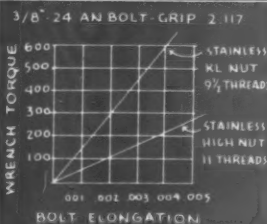
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TENSILE STRENGTH,
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- Manufactured in various materials!
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- Spins freely down to work. Stays positively locked!
- After breakaway, nut spins off freely, ready for re-use, without impairment of locking efficiency!



TORQUE vs. BOLT ELONGATION



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Specially-designed fixture speeds the . . .

Tightening of Housing Caps

Door closers produced by the Norton Door Closer Division of The Yale & Towne Manufacturing Company in its Berrien Springs, Mich. plant include an elongated cast aluminum housing tapped at each end for a screw cap.

These caps have the same axis and are started by hand. At one time each cap was tightened separately with the housing in fixed position. Now, after the two caps have been started by hand, they are fastened in a single operation by a torque-controlled impact wrench.

A special fixture was designed to eliminate the extra torquing operation. A rotatable set on a supporting disc is attached to the top of the work bench. At the center of the disc is a fixed tool that fits the square recess in the lower cap and enters this hole when the housing is set into a box-like holder above the disc.

When the socket in the pneumatic wrench is inserted in the upper plug or cap, both plugs may rotate at the same time, or either plug may rotate separately. Ultimately, however, turning resistance balances the wrench's torque setting and both plugs are set precisely.

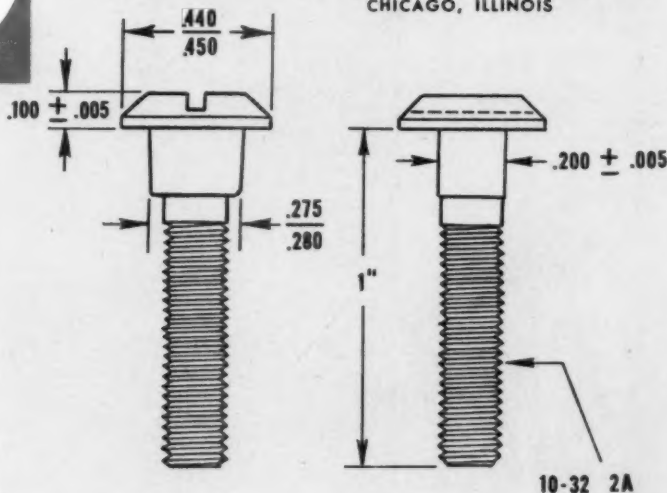


A simple rotating fixture speeds housing assembly by permitting two caps to be tightened at once.



Revere **SCREW & RIVET CORP.**

CHICAGO, ILLINOIS



heading problems solved with *Keystone XL Wire*

The cold heading of this generator shoulder bolt required extreme flow of material in concentric shapes, two diameters to be struck in one blow. Specifications were a rigid .005 tolerance. Because of the *flowability* characteristics of Keystone "XL" Wire, Revere Screw & Rivet Corp. have been able to produce this complicated fastener at high production rates and economical costs.

Revere president, Sol Gross, credits the uniform size and quality of Keystone "XL" Wire for increasing production, waste elimination and long die life. In fact, a three-fold increase in die life was realized.

Your cold heading problems can be simplified and solved when you put the *flowability* characteristic of Keystone "XL" Wire through your dies. Ask our Keystone wire specialists for complete information.

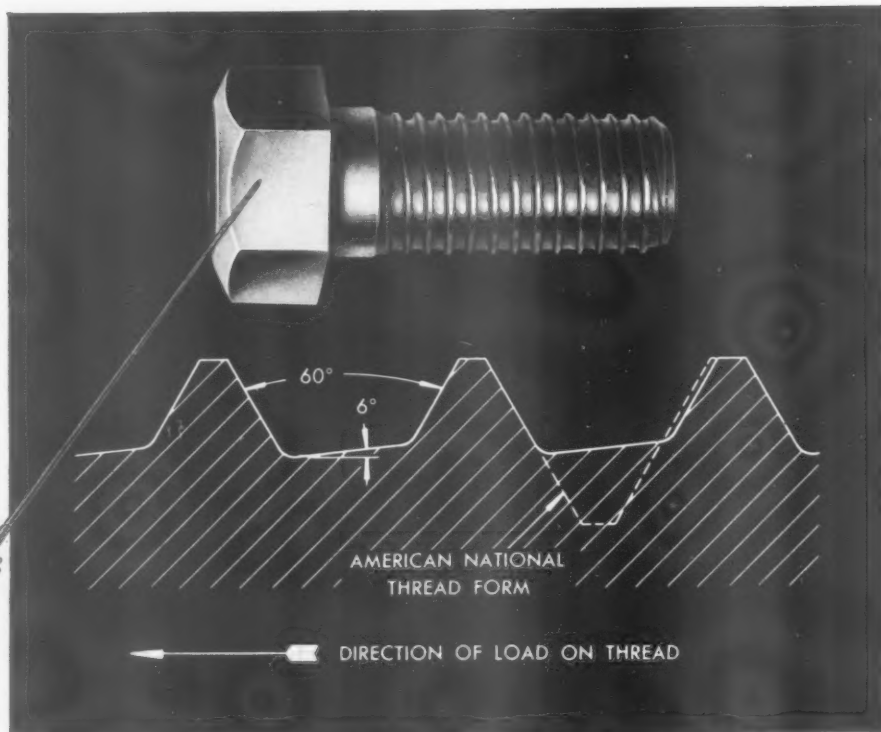
Keystone Steel & Wire Company, Peoria 7, Illinois



KEYSTONE WIRE FOR INDUSTRY

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NAT'S
quick facts
about
Fasteners...



Can **any** fastener actually **become tighter** in service?

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But self-locking, extra-strength LOK-THRED® bolts, studs and screws *do*, and even after long service you can expect their breakaway removal torque to average about 70% higher than at installation.

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Take our word for it, there are plenty of reasons* why LOK-THRED is superior for many kinds of fastening... and we'll be glad to help you develop any applications to your own products.

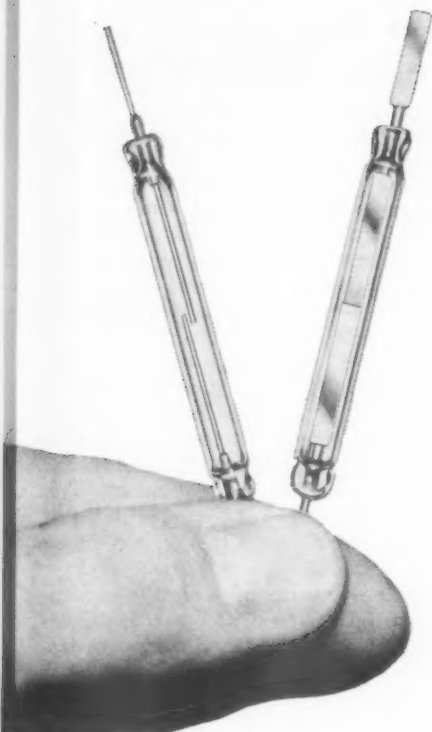
*They're all given in National's LOK-THRED booklet, with plenty of supporting data. Write for your copy.



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*Scientific cleanliness
and specially-designed assembly
machines lick contamination problem.*

CONTROLLED ATMOSPHERE RELAY ASSEMBLY

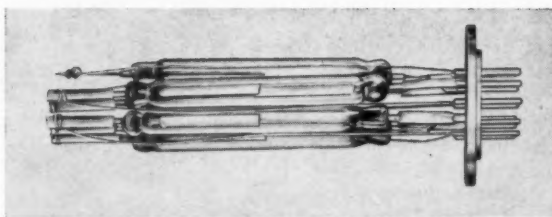
Contamination through dust particles—which are often invisible to the naked eye—has been a continuing problem in the assembly of delicate electronic relays. C. P. Clare & Company, a subsidiary of Universal Controls, Inc., has all but eliminated contamination as an assembly problem in its new manufacturing plant in Chicago.

At a cost of \$66 a square foot, three times normal factory costs, architects Rapp and Rapp designed a super-clean room to house six automatic 18-station machines to assemble relays. Basically, the units fuse special magnetically-operated alloy contacts within glass capsules in which air has been displaced with an inert gas.

Air supply in the assembly area is double-filtered, first through an electronic prefilter and then through an absolute filter. No dust particles greater than .3 microns in diameter can enter. As president Carl P. Clare points out, a cubic foot of unfiltered air contains hundreds of thousands of particles as large as 20 microns. (Ten-micron particles are visible to the naked eye. Compare these dimensions with machining tolerances, for instance, where .001" equals 25.4 microns).

Employees enter this manufacturing section through a separate entrance. They walk first across a metal grill, then across a mechanical shoe cleaning mat. Here an assembly of nylon brushes (at 432 strokes to the minute) deposits shoe dirt in a pit beneath, where it is vacuum exhausted to the open air.

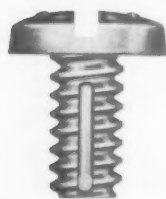
continued



Right top: Six switches clustered for mounting in a single container; Right bottom: Contact switch capsules are deposited in these bins after being assembled, fused and sealed.

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self-locking TERMINAL STRIP SCREWS



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- Will not shake loose
- Insure reliability of circuits

These specially developed self-locking screws resist shock and vibration, eliminating the possibility of short circuits due to screws working loose. They will not affect conductivity.

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LONG-LOK Self-Locking Terminal Strip Screws are available in all thread sizes and styles. For original equipment installation or overhaul—military or commercial—they provide highest reliability of component and system.

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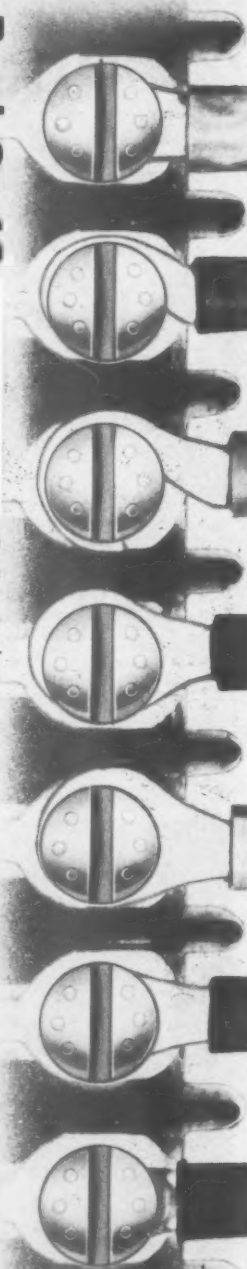
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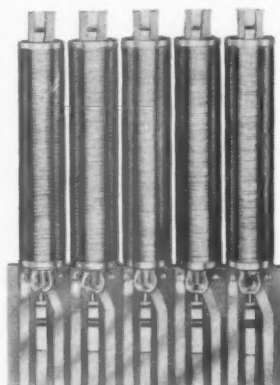
Assembling Sealed Relays, continued

Special outer clothing and caps are donned in an air-pressurized room with interlocking doors to prevent air leakage from the outer room. Again shoes are cleaned by a second brush and vacuum mat before they enter the relay assembly area.

Positive pressure, maintained at all times, is further protection against dust from outside rooms. The air conditioning system insures room temperatures of 72°F at all times, and, to offset heat required in the manufacturing process, the air is changed completely every three minutes.

Other special features include high output fluorescent lamps which provide 100 foot candles of light at working levels. These are recessed into the ceiling with glass lenses set in special neoprene gaskets to prevent dust from entering. The walls are a special green tinted Carrara glass from ceiling to floor with only vertical seams. The ceiling is coated with liquid tile. A vinyl plastic floor covers the base concrete slab.

This unflagging observance of scientific cleanliness, coupled with the design of the new relay, insures a relay which gives millions of perfect operations; hundreds of millions when it is operated at half its rated load.



Left: Ten switches are mounted in line, five on each side of a printed circuit board, with five magnetic coils; Bottom: 18-station machine automatically produces Clareed capsules. Recording instruments in background control inert gas mixture.



Continental has the cure for vibration "headaches" the one-piece locking screw that **won't work loose**

**IN MARKET CARTS — STAY TIGHT,
RESIST SHOCKS OF SEVERE SERVICE**



HOLTITE NYLOK hex head cap machine screw fastens chrome-plated steel tubing at right angles. Driven through holes in one section into tapped steel plug in end of adjoining part. Hold securely despite punishment of customer use.



IN CARBURETORS — HOLD ADJUSTMENT OF ANTI-STALL CONTROL



Hex head steel HOLTITE NYLOK machine screw maintains constant adjustment of anti-stall device attached to carburetors. Holds spring at required tension without variation through wide range of temperature changes.



IN EXHAUST FANS — HOLD MOTOR SECURELY DESPITE VIBRATION



Phillips truss head steel HOLTITE NYLOK machine screws are driven through rubber insulation mount into flange of vertical mounted motor. Screws do not loosen, resist constant vibration.



IN SHEARS AND SCISSORS — HOLD BLADES IN PROPER ADJUSTMENT



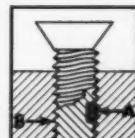
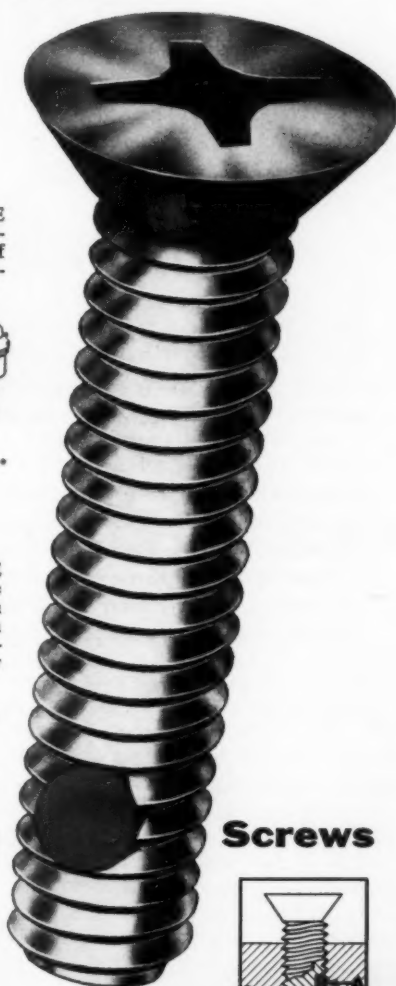
Binding head steel HOLTITE NYLOK machine screws are driven through drilled hole in one blade into tapped hole in mate. Hold proper blade contact, — permit easy disassembly for sharpening.



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HOLTITE® NYLOK machine screws are the simplified self-locking fasteners with the Nylon insert that eliminates the need for lock washers, jam nuts, wiring and similar devices. If you have assemblies where screws *must stay* where they are set, NYLOK is your practical choice. The applications above show how you can save trouble and complaints, — give your product a sales advantage.

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Resilient nylon plug (A) sets up a lateral thrust, smoothly wedges mating threads together (B). All locking action is on threads: head is not stressed. Locking is positive . . . seated or unseated.

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Locks seated or unseated
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HY-PRO TOOL COMPANY Division RESEARCH ENG. & MFG. INC. Subsidiary

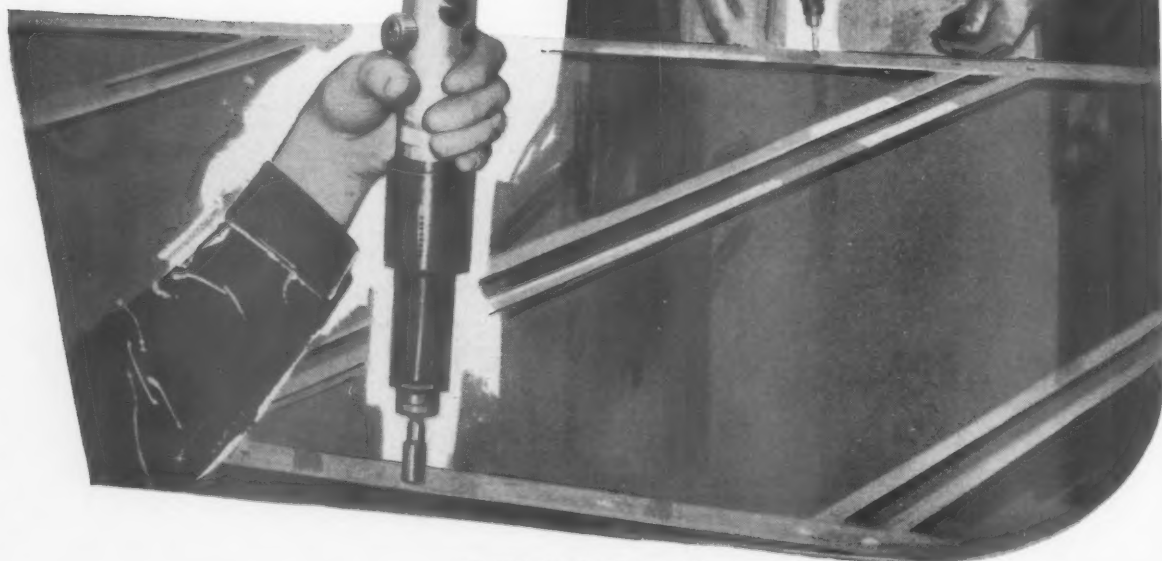
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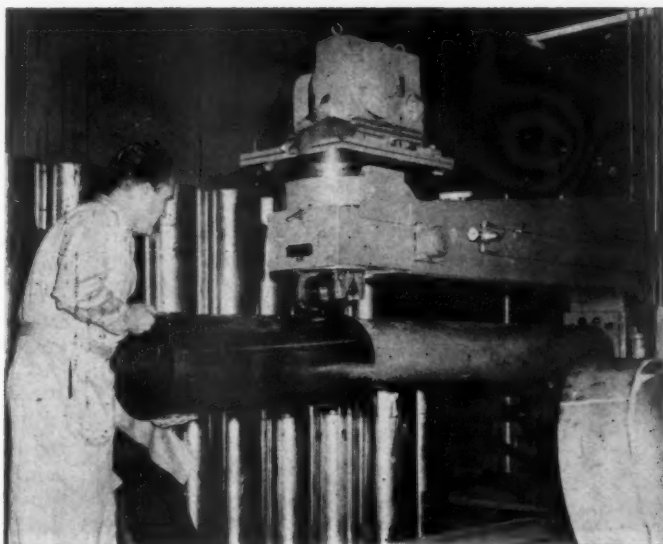
Thor Uni-Tork screwdrivers and nut setters make torque control of threaded fasteners as simple as turning on a light. Operator judgment and guesswork is gone. Uni-Tork snaps out of engagement when desired torque is reached, snaps in again when applied to the work. Thor Uni-Tork air tools have external torque adjustments from 10 to 100 inch-pounds. Available on all Thor air screwdrivers and nut setters and on Thor electric tools. Your Thor factory representative or distributor will show you the tools that think for themselves. Thor Power Tool Company, Aurora, Illinois. Branches in all principal cities.



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They said it couldn't be done. But one firm is butt welding sheet down to .001" thick.



Weld seam is being roll planished in a copper water filter shell.

Butt Welding Thin Gauges

by William D. Engstrand
West Coast Editor

The growth of thin gage butt welding as an assembly technique parallels the growth of the Airline Welding & Engineering Company. Started as a welding shop eight years ago, today the firm occupies a new 38,000 sq. ft. plant in Gardena, California. "Despite the many other types of welding we do, thin gauge butt welding has spearheaded our progress," states Byron R. Russell, president.

It would be aimless to describe how any one product is produced by thin gauge butt welding because the techniques are similar with all products. Tubular or conical structures of materials down to .001" in thickness can be easily butt welded. Small flat sheets can be edge butt welded together to form

large flat sheets. This happened in the production of stainless steel cover blankets for stainless steel honeycomb materials. The blanket material, .001" in thickness, could be purchased only in 20" long rolls. This material was edge butt welded together to form blankets measuring 10 ft. by 20 ft. in size. Tolerance of the weld seam, after roll planishing, was held to minus 0, plus .002". The weld seam itself was stronger and more flexible than the parent metal along either side.

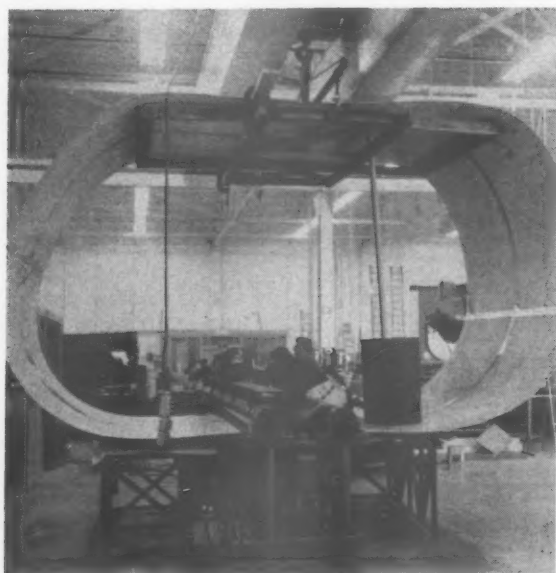
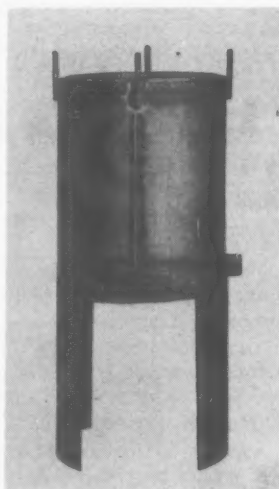
Edge butt welding of thin gauge materials has proved particularly advantageous in the production of sheet metal containers—especially steel drums and hot water heater tanks. When combined with roll planishing after welding, the butt weld seam is crushed down to a thickness comparable to that of the parent metal. When smoothed out and contoured with the container walls, after finishing, the seam cannot be detected by the naked eye. Roll planishing eliminates the necessity of seam grinding. The

continued





Top: A telescoping stainless steel tube is edge butt welded; Right: Weld seam on water heater tank is visible only because of metal discoloration; Bottom: Huge automatic butt welder produces final weld in a tank body. Note that tank diameter exceeds ceiling height above machine.



Butt Welding Thin Gauges, continued

planishing operation cold works the weld metal to improve its strength and ductility. Such materials as titanium, zirconium, copper, stainless steel, 1010 steel, the mild steels, and aluminum have been successfully edge butt welded in quantity.

Before describing the techniques involved in thin gauge butt welding and roll planishing, one more production job will point out the possibilities inherent in these processes. This is production of .005" stainless steel tubing by thin gauge butt welding and planishing for the manufacture of convoluted expansion joints. The tubing as welded and planished, along with one of the finished expansion joints is pictured on page 42.

The finished expansion joint includes three of these tubes telescoped together to produce an expansion joint wall thickness of .015". The multiple layers provide far more flexibility in the joint than could be obtained by a single sheet of .015" thickness. This is because a small amount of individual movement is allowed each of the three tubes during joint expansion or contraction.

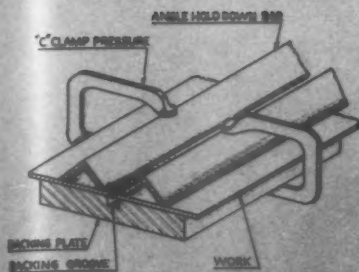
To edge butt weld these tubes so that they will telescope together in what in effect is a press fit, diameter tolerances (nominally 10") must be held to minus 0, plus .002". This is accomplished by first edge butt welding the tube, allowing for the slight expansion or widening of the weld seam that will be caused by the crushing action during roll planishing. Because of the telescoped assembly, each of the three tubes must differ in diameter by a distance equal to twice the thickness of the material, or .010". Yet these extreme tolerances are obtained without difficulty.

It might seem to many engineers that during convoluting of the tube into an expansion joint, the butt welded seam would be liable to fracture due to the short bend radii employed in each convolution. This is where roll planishing pays a big dividend because, during planishing, the metal is cold worked until its ductility exceeds that of the parent metal. These expansion joints are widely used in chemical and oil industries all over the country. While Airline Welding & Engineering does not do the convoluting, they produce the telescoped tubes ready for the convoluting process.

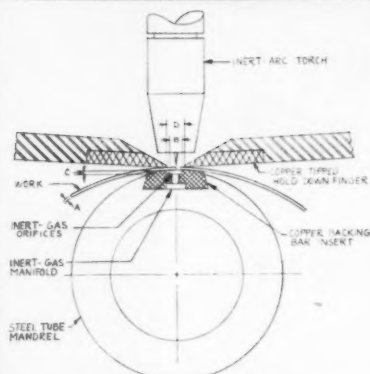
CLEANER, LIGHTER WELDS

The above job description should certify to any production engineer that thin gauge butt welding can serve the requirements of any structural sheet metal job. This method will produce a weld seam that is cleaner, lighter in weight, and requiring less material than the conventionally-used lap welded seam.

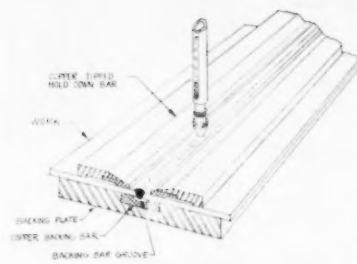
Thin gauge butt welding is based on what is known to welding engineers as the "chill-shunting theory" of welding. In substance this theory has to do with the conducting of heat away from the weld area fast enough to prevent overheating effects, extreme distortion, and possible burn-through of the material being welded. A crude form of chill



Crude application of the chill shunting theory of welding thin gauges.



MATERIAL THK	A .005 - .010	.010 - .015	.015 - .020	.025
WIDTH B	.040	.062	.080	.100
DEPTH C	.015	.020	.025	.030
HOLD DOWN SPACE D	7/16	7/8	1 1/8	1 1/4



Left: Positioner setups with automatic chill-shunt tooling, an inert-gas, shielded non-consumable electrode welding process; Top: chill-shunt tooling for a butt joint.

shunting has been used for years in butt welding thinner material. In this technique, the material was merely butted together over a slot in a plate, then angle irons or some other type of bar shape were clamped against it adjacent to the weld area. The additional mass of the bar stock aided in dissipation of heat from the weld area. But this was a cumbersome and slow process, and lacked consistent results.

CHILL SHUNTING APPLIED

Here is a basic description of how the chill shunting theory is applied in automatic butt welding machinery. A wide backing plate or welding mandrel made of steel is provided with a relatively wide slot for insertion of a copper backing bar. Copper is used immediately under the weld area because of its very good heat conductivity. To aid in aligning the work, holding it in place during welding, and again to expedite conduction of heat away from the weld area, hydraulically actuated steel hold down bars with copper tips clamp down on the work from above, after it has been aligned over the slot in the copper backing bar.

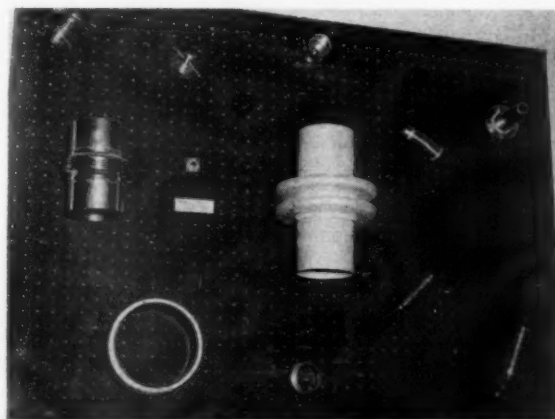
In actual construction, the welding mandrel is a large, heavy-walled steel tube with a milled slot to receive interchangeable copper backing bars. These copper backing bars, available with different width slots for different types of welding, have a milled, inert gas manifold punctuated by numerous drilled orifices which admit inert gas into the slot directly under the weld seam. Thus, when an inert gas welding head is used, the weld area is entirely contained in an envelope of inert gas which effectively prevents any oxidation either in or on the weld.

In actual machine construction, the hold down bar is segmented into a number of closely spaced hold down fingers ranging from 1" to 2" wide. After the work has been aligned over the slot in the copper backing bar, these hold down fingers (hydraulically actuated) clamp downward and inward. The inward

motion (towards each other) is provided to press the sheet edges very tightly together. This motion is so effective that on very thin gauge material, a slight metal upset occurs between the sheet edges. This butted tightness aids materially in securing an optimum weld seam. After the sheets are clamped in place, the automatic welding head is adjusted according to the type of welding to be done, then travels at a preadjusted speed along the seam to perform the weld.

Practically any type of welding head desired can be mounted on these machines. In most cases, however, where very thin gauges are being welded, no weld wire or additive weld metal is used. The tightly fit edges are merely fused together. This has several advantages. The weld seams are less bulky and are easier to finish. The original parent metal alloy is maintained in a homogeneous state. There is less danger of weld inclusions, and, because no welding wire is used, the simple fusion process is somewhat less costly. While its ability to produce square edge butt joints has been responsible for

continued



Display board shows different products initially component-joined by butt-welding.



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Butt Welding Thin Gauges, continued



Byron Russell holds .005" tube which is telescoped with two or more tubes, then convoluted into expansion joint shown on the display board.

the popularity of this machine, double flair joints, corner joints, and lap joints can also be produced.

The weld joint produced by this automatic butt welder is cleaner and better proportioned than can be produced even by the most expert hand welding. However, in high precision work, and in work where extreme ductility is required, the company-designed roll planisher is used after welding. In this machine, two pressure rolls are forced together by the action of a hydraulic cylinder. One of the rolls is powered so that when sheet metal is inserted between them, it will be dragged through the rollers.

In weld bead planishing, one end of the bead is inserted between the rolls, and the operator guides the work so that the weld bead continues to feed directly between the rolls. Pressure is variable on the rolls up to 10,000 or 12,000 psi, depending upon the machine. But since much less than a full square inch of the weld bead area is in contact with the rolls, the actual pressure on the bead may be as high as 150,000 psi.

This pressure actually crushes the weld metal down to a thickness comparable to that of the parent metal. In so doing, it smoothes the weld metal out and eliminates weld bead grinding which formerly had to be accomplished to get a finish coating over the weld bead area. Some specialized roll planishers have contoured roll surfaces which actually contour the weld bead and blend it with the contours of the part being planished. These contoured roll planishers are widely used in the appliance industry for contouring the weld bead on hot water heater tanks which will subsequently be coated with porcelain enamel. After application of the enamel coating, the bead will be invisible.

A second big advantage of roll planishing accrues from the cold working of the weld metal as it is

crushed down. This increases its toughness and strength, with the amount of the increase dependent upon the material. When butt welded pull test specimens consistently break in the weld when tested in the unplanished condition, they will just as consistently break outside the weld when tested in the planished condition.

There is one other advantage of planishing which cannot be overlooked in high precision work. Naturally, as the weld bead metal is crushed down by roll planishing pressure, it elongates to a certain extent. This will slightly increase the diameter of a welded tubular or conical structure. When high precision diameters are required, the part is butt welded just slightly undersize, then expanded to the proper size on the roll planisher. If one pass under the rolls doesn't quite do the job, the operator may make two or three planishing passes. By following this practice, finished diameters down to .001" tolerance can be obtained.

HIGH PRECISION METHOD

Let us give one more example of the high precision possible in thin gauge butt welding.

These products are the screen centrifuges widely used in both the plastics and citrus juice industries. These very thin gauge screens have up to a million holes per square inch which are chemically etched in them. The finer screens appear as solid to the eye until held up to the light. The holes are plainly visible in the coarser screens.

At Airline Welding & Engineering, these screens are edge butt welded into the necessary cylindrical or conical shapes, then planished to reduce the weld bead to parent metal thickness. On some of the coarser screens, used to produce a plastic product by centrifuge distribution of the plastic, the screens are welded without altering the shape or spacing of the holes over the weld bead area. In this case, width tolerance of the butt welded seam was held to .010"; thickness tolerance to .002". Trial-and-error attempts to produce this homogeneous hole pattern were effectively eliminated by the cost of the screen itself—\$1200 per square yard!



May, 1960



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For information on other T-J Rivitors and Clinchers write for Bulletin No. 555.



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Assembly and Fastener Engineering



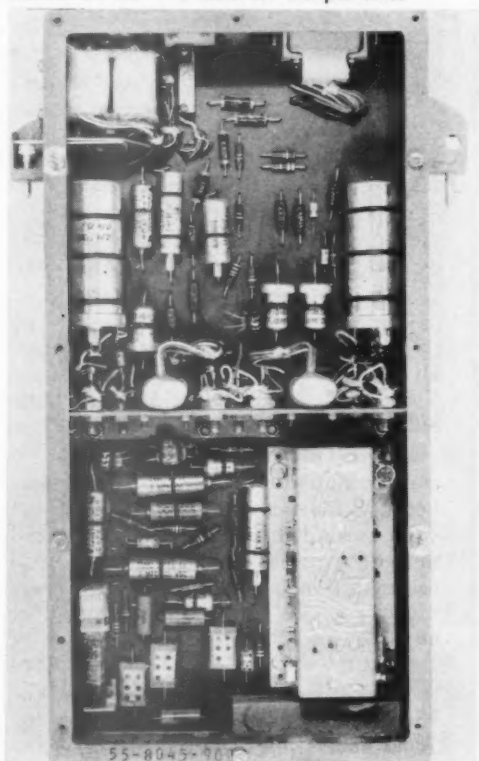
Round rubber straps hold-down capacitors, resistors and other components

MOUSETAILS SECURE MISSILE COMPONENTS



After recovery of nose cone, mousetails still held most components in place despite many G's of force and chemical erosion. Only failure was where phenolic mounting plate cracked at mounting holes.

Note the neat layout of one electronic assembly for a Bomarc missile before firing. Mousetails secure all but the smallest components.



by Darrell Ward, Engineering Editor

A prophetic insight into the future is often presented in science fiction movies. The Mighty Mouse cartoons didn't miss this bet very far, except the missiles and electronics industries have elevated the significance of small parts to greater esteem than the animal cartoon version of Superman. Instead of taking the whole mouse, they now have found the mousetail instrumental in getting complex electronic equipment off the ground and out into space with greater reliability.

After extensive research and laboratory testing, Boeing declared in a recent report that . . . "Proper application of these straps (mousetails) should reduce primary installation time of (electronic) components, sustain reliability of the assembly and reduce the time required for removal and replacement of components and wire bundles."

What are these mysterious mousetails? Basically, they are small, rubber compound straps which look like round cocktail toothpicks. However, instead of using them to pick up olives, pickles or hors d'oeuvres, mousetails in some electronic assemblies will hold down capacitors, resistors and other components subjected to as much as 25 G's during missile firings.

Developed by Rubber Teck, Inc., mousetails come in a variety of sizes and shapes, some with an eye like a needle for threading the opposite end back through the first as with a lariat noose. The friction on the surface and the elastic properties of the rubber make the ends of the mousetails hold securely whether they are inserted through the undersize holes in a chassis or looped back on one another to make a slipknot tie around cables.

When the mousetails are installed, they are elongated 100%, \pm 10%, to stretch them through the mounting holes. Test reports showed that the effort to remove the mousetail after aging and setting of the elastomer is increased by approximately 20%. No burred or dimpled edge is desired on the hole to grip the rubber strap. In fact, a clean hole is required to avoid cutting or tearing.

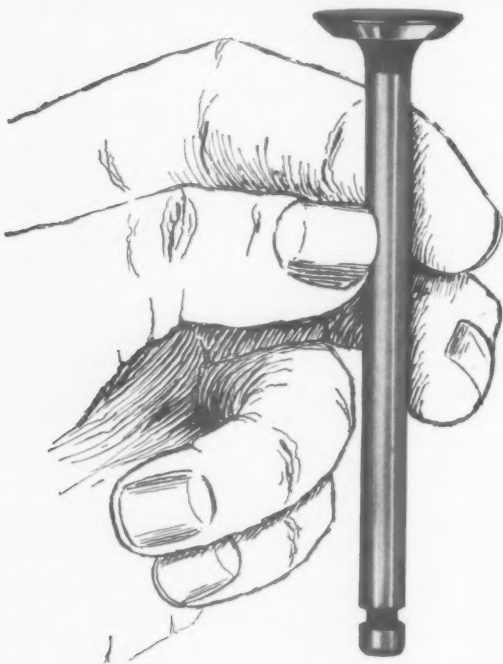
Mousetails, themselves, seem rather far ahead of many other factors involved in radia-

continued

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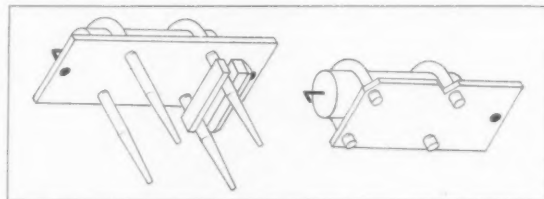
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Mousetails Secure Missile Components, continued

tion problems of outer space. They can be subjected to a radiation dose of 1.21×10^7 Roentgens without serious results to their physical properties.

Boeing's findings were based on the average values of numerous mousetails molded from Rubber Teck Compound RT 332-70. Results indicated compatibility with many different environments—physical and chemical as well as radiation. However, solvent tests showed that only aliphatic naphtha could be tolerated in prolonged contact. Therefore, all cleaning of electronic assemblies, before and after installation, should be with aliphatic naphtha.



Normal mounting of components requires only a clean hole through which end of mousetail can be drawn. Surplus end can be trimmed. For resistance to applied forces above 16 G's, a clamp is used to help retain the ends.

Resistance of mousetails to temperature changes was demonstrated by the fact that no cracking whatever appeared after nine cycles of a test in a range from -65°F. to 160°F. Physical force was used in the extreme low temperature test down to -80°F. to remove mousetails from the test jig. They were pulled violently after immersion in the -80°F. bath and did not pull loose from the jig, nor did they show any evidence of crystallization.

Another test proved that ozone resistance insures added reliability of component assemblies in this kind of atmosphere. A concentration of 6 ppm ozone for 200 hours is approximately equivalent to 75 years at normal atmospheric ozone concentration on the West Coast. Yet, very slight pitting was found in the mousetails at the end of the test and no complete deterioration or breakage was found.

Vibration tests of components installed with mousetails demonstrated no serious problems if a force of 16 G's was applied for as long as 8 minutes. It was also determined that forces much greater than 16 G's can be handled with special clamps to hold the mousetail ends on underside of a panel.

Why all this extensive testing and reporting on such a simple thing as a rubber mousetail? Simply because the physical properties of the mousetails when installed, or when being installed and removed, are of extreme importance to the company assembling electronic component boards or dressing cables. Very little effort is required to install and elongate the mousetail. But, after aging and setting, the effort to remove them increases by 20%.

The ultimate tensile strength of the mousetails is reported to exceed 4250 psi and the modulus at 200% elongation should be from 1000 to 2000 psi. •



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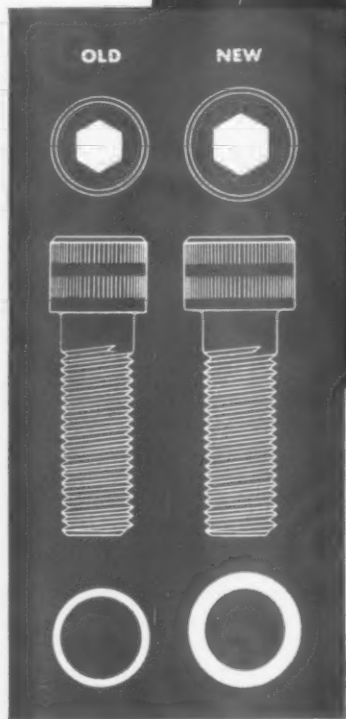
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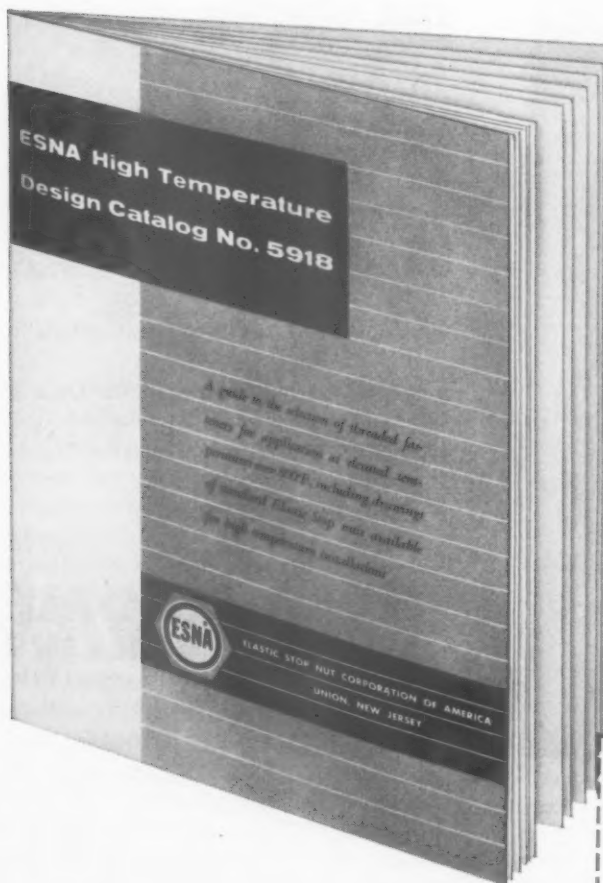


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Section III—Fasteners for use to 1200° F.

Section IV—High performance fasteners for use to 1200° F.

Section V—Fasteners for use over 1200° F.

Section VI—General production and design data covering the use of shank nuts for internal bolting application in gas turbine engines.

Section VII—Design data covering the application of circular gang channel on gas turbine flanges.

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FASTENER DRILLS AND TAPS OWN HOLE

Where adaptable to the job, new fastener can help minimize problems of hole alignments. Early applications are in light gage metal parts.

by **S. S. Kohn**, Vice President
Parker-Kalon Division
General American Transportation Corp.



Formation of spiral chip shows metal is being removed by new fastener as it drills and taps its own hole. The genesis of the Tapit was a screw which had been produced by rolling a Type A thread from a specially designed cuneiform pointed (pyramid type) blank.

Every facet of industry is re-examining conventional assembly practices with the view of speeding up production, lowering costs, and at the same time bettering the fastening. The awareness of these problems in industry is self-evident if a study be made of the weekly Official Gazette of the U.S. Patent Office. Almost every issue contains numerous types of fasteners most of which are designed to accomplish one or more of these objectives.

One of these new fasteners is the Tapit which incorporates in one unit two dissimilar but integrated functions. It drills its own hole and forms its engaging thread simultaneously.

At first glance the Tapit screw appears similar to the conventional Type A thread-forming screw, but on closer examination the new screw has distinguishing characteristics that set it apart. A cuneiform (pyramid type) pointed screw blank, capable of drilling a hole in sheet metal, has been mated with the tapping features of the thread-forming screw.

The fact that a screw could be designed and produced to form or cut its own thread was an incentive that spurred the development of an even more versatile fastener. Since a screw could make its own mating thread, why could it not also drill its own hole?

However, until recently there has been but little progress made in this direction. The reason is simple to understand once the problem is analyzed.

A hole may be drilled in sheet metal with a tool as simple as a pointed nail. Apply sufficient pressure to a rapidly revolving nail and in no time a ragged pierced hole will result. By adding engineered

continued

Fastener Drills and Taps Own Hole, continued

refinements to the nail, such as a diamond shaped point, plus hardness and employing the same speed of rotation and pressure, metal will be removed and the quality of the hole considerably improved.

The progress of the metal drill through the ages is a step-by-step evolution. Each era of mechanical progress has contributed its quota of improvements. Today there are hundreds of different types and kinds of drills, each designed to meet the requirements of our technology. With this background, it was assumed that by producing a headed screw blank having a multiple-fluted shank and provided with a drill point, such a blank after threading and hardening would result in an ideal fastener. Unfortunately, the problem was not as simple as that.

In order to function properly, thread-forming screws must have their thread so designed and hardened that they are capable of compressing or extruding the engagement material to form a corresponding mating thread in the metal. They are used in sheet metal holes slightly larger than the root diameter of the thread, but smaller than the outside diameter of the screw. The thicker the material they engage, the larger the hole diameter.

As the screw is turned into the hole, the extruding action of the hardened thread decreases the internal diameter of the hole. This can be verified by gaging the hole before and after thread formation. It is apparent that for a proper mating of a drill and a thread-forming screw, a means must be provided to do the following: create a mechanism for the minimum penetration of the engagement material; design a device for enlarging the hole until the lead thread of the screw is reached; and remove continually material in advance of the helix until the root diameter is approached.

By successively performing this sequence of operations, the object of the hole-drilling, thread-forming screw has been accomplished. The statement of the problem, as was expected, was simpler than the solution.

A breakthrough in this development came about six years ago when Parker-Kalon engineers were called in to work with the designers of an automatic lawn watering device. Certain assemblies required attachments that had to be fastened to aluminum tubing. Since thinwall tubing was difficult to drill, it was realized that this assembly would be a good application for a hole drilling screw. Many varieties of such screws that had previously been tested and discarded were reexamined. One looked promising. It had been produced by rolling a Type A thread from a specially designed cuneiform pointed (pyramid type) blank. This was the genesis of Tapits.

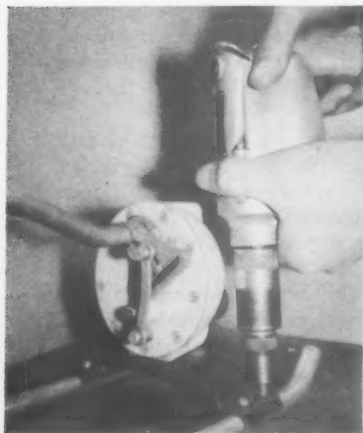
After considerable research and the production of one lot after another of test samples, a screw was designed that not only drilled its own hole, but formed its own thread. The fastening it made was more secure than those that could be made with conventional Type A screws. This came about because the resulting hole produced by the Tapit was the same diameter as the root diameter of the screw itself. Since their development, more than 10 million of these new screws have been used in the assembly of lawn watering devices alone.

FIVE VARIABLES TO CONSIDER

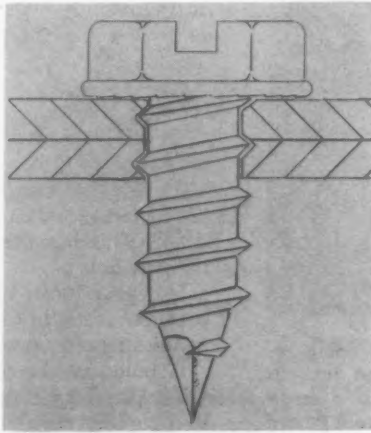
Because assembly details vary so widely, it is impractical to make blanket recommendations for specific applications of this new screw. There are five variables that must be given consideration.

1. Hardness of engagement material: Naturally the hardness or density of the metal has a bearing on the ease of penetration of the drill point. The same conditions apply as with an ordinary drill. The harder the material, the greater the driving pressure required to pierce the metal. At the present stage of development, Tapits are recommended only for comparatively light gages of sheet metal, such as galvanized sheet .020 to .035" thick, automobile deep drawing stock .020 to .040" thick, stainless sheet .015 to .025" thick, aluminum extrusions or sheet not exceeding .060" thickness.

2. Displaced material: This is the diameter of the hole that Tapits produce in metal as they are



First use of new screw was fastening base section to aluminum tubing.



Cross-section shows threads engaging two thicknesses of sheet metal.



Tapits can be driven with automatic equipment such as this Jet-Setter.

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ORIGINAL DESIGNS

MAY 1960

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JUNE, THE MONTH OF ROSES, WEDDINGS & THE BEGINNING OF SUMMER IS REALLY AN EXCITING TIME OF THE YEAR. THE GARDEN'S THEN A RIOT OF COLOR AND THE FRAGRANCE OF ROSES.

- **FOR SOMETIME NOW OUR GORGEOUS HYBRID CLIMBERS HAVE BEEN NEGLECTED FOR WANT OF A PROPER SUPPORT OF SOME KIND. NOTHING CAN SHOW OFF A BLOOMING CLIMBER OR FLOWERING VINE BETTER THAN A PERGOLA.**
- **BUILDING ONE IS NOT THE CHALLENGE THE AVERAGE HANDY-MAN MAY THINK. IN DESIGNING PROJECT NO.11 I HAVE CONSIDERED SIMPLICITY & SIMPLE CONSTRUCTION. STANDARD DIMENSION LUMBER IS USED & STURDY CONSTRUCTION IS ASSURED BY ASSEMBLING WITH "ROCKFORD" SCREWS & BOLTS AS SHOWN.**
- **BY SETTING PERGOLA ON CONCRETE CURBS ROTTING OF POSTS IS ELIMINATED WHICH OCCURS WHEN SAME ARE SET INTO GROUND. IT ALSO MAKES FOR EASIER PLUMBING & LEVELING OF SUPERSTRUCTURE.**
- **USE FIR, REDWOOD OR CYPRESS & FINISH NATURAL FOR RUSTIC EFFECT OR PAINT WHITE.**
- **DESIGN SHOWN IS BASIC & SIZE CAN BE ADJUSTED TO REQUIREMENTS. GATES MAY BE ADDED AS WELL AS CONNECTING WOOD FENCES.**
- **MAKE A STUDY OF YOUR PARTICULAR LAYOUT IT IS A LOT OF FUN PLANNING.**

MATERIAL C

10" COLUMNS	"A"
10" LINTELS	"B"
10" PURLINS	"C"
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10" BRACES	"E"
72" LATTICE	"F"
36"	"
36"	"
26"	"
	"G"

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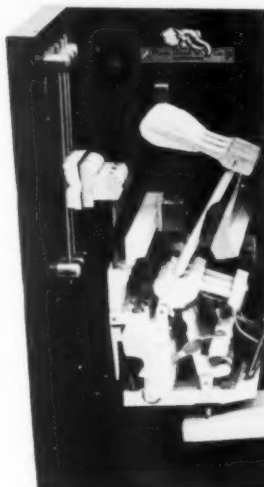
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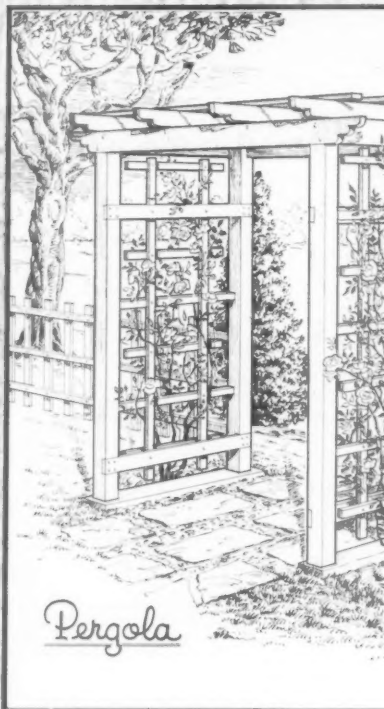
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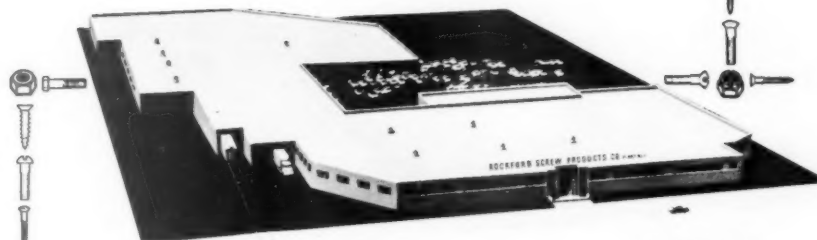
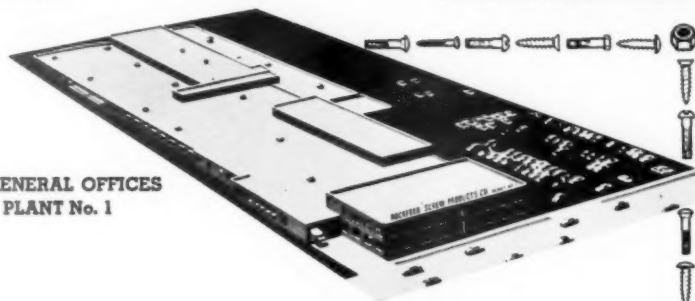


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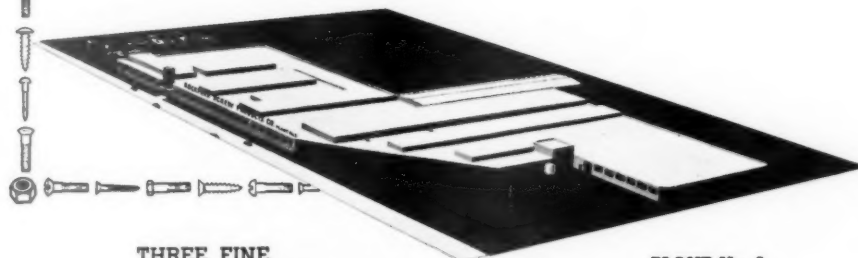
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GENERAL OFFICES
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PLANT No. 2

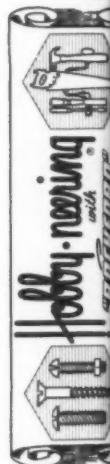


PLANT No. 3

THREE FINE
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Attaching covers to transformers.



Fastening shroud to industrial oven.



Assembling a fluorescent fixture.

turned in. Consequently, the larger the diameter of the screw and the thicker the engagement material, the greater will be the power required to drive the fastener home.

3. Thickness of metal: The combined thickness of two or more sheets to be joined must be considered. Generally speaking, this thickness should be no greater than $\frac{1}{4}$ the screw diameter. Otherwise the amount of torque and pressure required to drive the screw may be greater than the strength of the screw. The rule of thumb formula as applied to drive-strip ratios should provide a safety factor of 2 to 1. This formula is applicable to steel. In the case of stainless, which is harder and tougher than galvanized stock or aluminum which is softer, the ratio must be increased or decreased accordingly.

4. Driving speed: Tapits may be driven with electric or pneumatic screwdrivers, using either manual or portable automatic feeding machines. Since the design of the screw point is somewhat different than the conventional high speed drill, for best results the driving speed should be between 700 and 1000 rpm.

5. Driving pressure: Sufficient pressure must be applied through the driving tool to enable the drill point to start penetrating the metal. If too little pressure is used, the cutting action of the point is materially reduced. Furthermore, continued driving without material penetration will generate considerable temperature at the point, thus reducing the efficiency of the cutting faces of the drill point.

Since speed and pressure must be applied simultaneously to make them function, standard Tapits are produced with hexagonal washer heads. They are driven with conventional hexagonal sockets, either plain or magnetic. The hex head fits the socket snugly to assure that full pressure is transmitted through the axis of the screw to the point. As soon as the point of the revolving screw impinges on the metal, the drill point starts removing material. As rotation and pressure continue the hole is rapidly enlarged.

By the time the point has penetrated the metal, the lead thread of the screw enters the hole thus

formed and starts engaging. Since the cutting faces of the drill point extend to the lead thread, the hole continues to be enlarged by a combination of reaming from the point and extruding from the screw thread. As soon as the point is completely through the metal, the hole is the same size as the root diameter of the screw.

For fastening parts to sheet metal provided with clearance holes, the screws are simply driven into the metal as a wood screw is driven into wood.

When fastening two pieces of firmly-held metal, the screws will drill through both sections. The threads engage in each sheet, binding them together as though they were locked in a vise.

If the two sections are not held together firmly, one of two things will happen when the screw is turned in. If the bottom section has little rigidity, it may be pushed back by the point of the screw as it engages in the top section. Then the assembly cannot be completed. If the part to be attached has sufficient rigidity to prevent buckling or distortion, the screw, when driven home, will penetrate and start engaging in the bottom of the top section. The two will be drawn together due to the action of the helix until the screw is seated home, at which time they will be separated by one full thread. Continued driving will cause the thread to shear in the top sheet, thereby forming its own clearance hole. As soon as this takes place, the bottom sheet may be pulled up and the fastening completed.

TYPICAL APPLICATIONS

One common use of this new screw is in elbows and other duct work. Similar light gage sheet metal applications include such enclosures as water heater jackets, air conditioner shrouds, oven covers, etc. Other uses are in the assembly of metal carports, awnings and jalousies.

However, the mass production industries that assemble products using light gage metal parts offer the most opportunities for developing the full value of this fastener. If the screw can be adapted to the job, it will minimize to a great extent a host of problems related to hole alignments. •



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LAMSON & SESSIONS

Three types of fasteners—lock nuts, plug-type inserts and line clamps—will be featured in Booth 2002. Plug nut threaded inserts, once pressed into ductile material, become self-clinching. Three types of Stover lock nuts reportedly require only 75% of the tightening torque to produce the same clamping force in bolts as produced by comparable fasteners. Safe-Line clamps are designed for 6x9 and 7x19 right hand lay steel wire rope.

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HELI-COIL

▲ A miniature automated inserting tool for high speed production installation of wire thread inserts will be demonstrated at Booth No. 1828. Capable of driving up to 1200 inserts per hour, the new hopper feed and light-weight gun combination is designed specifically for automated assembly line operation in any type or size of material where higher loading strength and greater resistance to wear are required in tapped holes. Weighing only 18 ounces, the gun can be remotely operated up to 8 ft away from the hopper feed mechanism.

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MINNESOTA MINING

▲ How a line of structural adhesives can solve design and assembly problems will be demonstrated in Booths 1718 and 1720. Scotch-Weld thermosetting film can be die cut into complicated shapes and provides room temperature shear strengths up to 4200 psi.

One-part liquid modified epoxy adhesives contain a latent hardener to eliminate the need for weighing and mixing. Excellent for honeycomb bonding, these adhesives require only contact pressure. Pictured is a cutaway section of a vaporizer, constructed by bonding two concentric aluminum stampings using a one-part epoxy. Two-part epoxy adhesive require mixing before use but no pressure for curing.

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ALCOA

New joining techniques will be among the products and methods exhibited in Booth 2032. Samples will also show finishes, fabricating processes and unusual end-products formed by the company's customers. More than 50 separate categories will interest designers.

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LOCK AND TURN



RELEASE AND RATCHET



RE-LOCK

BRISTOL

▲ Handy open-end ratchet wrenches and the 1960 socket head cap screw series will be displayed in Booth 430. Wrenching is reported to save up to 70% in tightening nuts; the line exceeds government specifications for open-end wrenches. In the 1960 screw series design, the head is 1½ times the body diameter of the screw. This provides greater bearing surface, while eliminating indentation of the surface in which the screw bears.

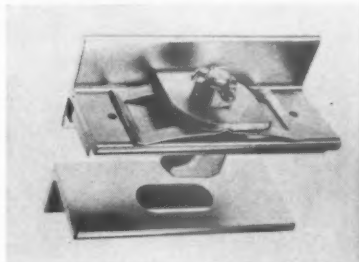
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PANDUIT

Nylon cable clamps and ties, plastic wiring tube and new plastic control panel wiring ducts will be exhibited in Booth 409. In addition, molded one-piece corner junctions, T-junctions and straight thru couplings for use with wiring ducts have been developed. Three methods of mounting the ducts

—by snap-clips, screws and threaded studs—will be demonstrated.

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SIMMONS

▲ A special fastener for use when the strength of a bolt is required but where fast opening and closing is desirable will be introduced in Booth 2434. The Cam-Bolt, now in use on missile and engine containers, maintains constant, leak-proof seal of any predetermined pressure. It locks and unlocks with a quarter-turn. A single adjustment made during installation insures proper sealing without the use of a torque wrench or further tests or adjustments.

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ROBIN PRODUCTS

Visitors to Booth 333 will be invited to install self-retaining stamped fasteners and clips on sample plates. A clip hopper and both hand and air tools will be available to demonstrate Riv-it applications by easy clinching. Used in all mass production industries, the basic part can be modified to individual requirements, such as fastening tubing and wiring, moulding, holding decorative ornaments.

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LEE SPRING

▲ Compression and extension springs in stainless steel and music wire will be exhibited in typical applications in Booth 1109. Over 750 different springs are stocked.

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May 23-26

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To preview and plan
the products of the '60s

SOUTHC0

Two small quarter-turn fasteners and an adjustable pawl fastener will be featured in Booth 1210. The Lion miniature, designed for electronic, airborne and industrial units, has six stud lengths to accommodate total material thickness (both sheets) from .040" to .159". Where shock resistance is important, another panel fastener consists of the standard Lion No. 2 quarter-turn stud and retainer, with the spring installed in a special mounting assembly. The key-operated pawl fastener is suited for instruments and cabinets.

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**HEYMAN**

▲ Accordion-type terminal bushings which snap into curved and flat surfaces will be displayed in Booth 1217. The miniature nylon-insulated receptacles mate with 3/16" and 1/4" standard disconnect terminals. New sizes of nylon circular snap bushings for mounting hole diameters of 3/8" up to 1 1/4" will also be introduced.

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MAC-IT PARTS

Socket head cap screws have been designed with more bearing surface to result in less compression because of the change of direction in stress. The fasteners will be exhibited in Booth 1604. The taper in head design creates greater locking effect, requiring up to 23% more torque to release. Over-all working efficiency over previous design is increased 27%.

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**BUCHANAN ELECTRICAL**

▲ Electrical connecting devices will be featured in Booths 2216 and 2220. New pre-insulated splice caps combined with a ratchet-controlled crimping tool can be used for wide ranges of solid or stranded wiring. Both air and hand Tri-sure-tools have a three

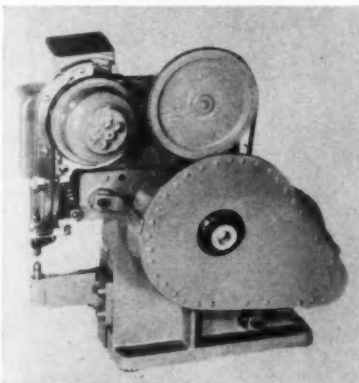
indent rolling-action crimp which distributes the crimping pressure uniformly and minimizes thinning of insulation. Snap-fit terminal blocks will also be exhibited.

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UNITED SHOE MACHINERY

A new principle that can be used for the transmission, conversion or change of mechanical motion will be demonstrated in Booth 924. The transmission, known as Harmonic Drive, will be shown in a variety of forms: a radar antenna drive with a reduction ratio of 40,000 to 1, a small servo-gear motor in which the drive is part of the housing, an industrial gear motor, and a micro-linear conversion unit. In addition, Pop blind rivets, a line of automatic screwdriving units, industrial adhesives and eyelets will be displayed.

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**J. L. THOMSON**

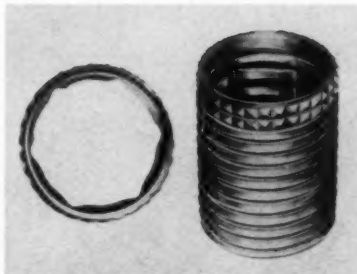
▲ Precious metal electrical contacts and the automatic machinery used for assembling them will be featured in Booths 625 and 724. Cold headed from sintered silver-cadmium oxide wire in rivet form, the contacts' conductivity runs 84% to 88% I.A.C.S. The assembly machines have head and anvil designs which permit attachment or double heading of contacts to precision tolerances.

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LAMINATED SHIM

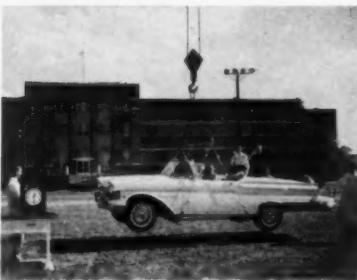
Solid shims that peel for adjustment—called Laminum—provide quick and easy alignment on assembly lines. Both brass and mild steel shims are now available with plastic bond, as are stainless steel and aluminum shims. Booth 1221 will also exhibit sample stampings, including lock washers, clamps, brazed assemblies and special parts.

Use postpaid card. Circle No. 16

**ROSAN**

▲ A new thin wall threaded insert features an internal thread lock which exceeds MIL-N-25027 specs. The lock design is flexible and does not damage the bolt or insert. Slimsert has a wide temperature range, is light in weight, has positive external lock, minimum edge distance and is corrosion resistant. It is installed in two operations, to be demonstrated in Booth 1215. The fastener comes in aircraft and commercial qualities in sizes No. 10 through 1/2".

Use postpaid card. Circle No. 17

**EASTMAN CHEMICAL**

▲ Do-it-yourself will be the theme at Booth 2004 where engineers are invited to evaluate the strength and speed of setting of Eastman 910 adhesive. A variety of plastics, metals, rubber, etc. will be available for testing. In the pictured experiment a drop of adhesive is applied to the end surface of a 2" diameter steel rod, tapped to receive an eyebolt. The joined rods are placed between a crane hook and lifting harness and after setting for 30

use these tools
to **FIGURE**
fastening costs!



use these tools
to **REDUCE**
fastening costs!



On production and maintenance work in manufacturing and service industries, Apex screwdriving tools have helped cut fastening costs for large and small companies alike. There's an Apex screwdriving tool to drive just about any kind and size of screw-type fastener . . . for use with any popular make of power or manual driver. All Apex Standard and Magnetic Screwdriving Tools are listed in Catalog 30-C; write, on your company letterhead please, for your copy.



APEX FASTENING TOOLS
SCREWDRIVING • NUT RUNNING • SPECIAL

The Apex Tool Company, Inc. • 1000 E. Portage Blvd. • Dayton 2, Ohio

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Design Engineering Show, continued

minutes the bond supports a load of 5000 pounds.

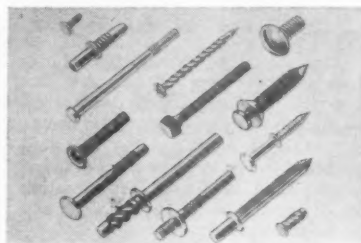
Use postpaid card. Circle No. 18



TINNERMAN

▲ Evidence to prove the value of engineered multi-purpose fasteners will be presented at Booth 1226. An average of 25 new Speed-Clip fasteners are developed every week and actual production line assemblies will be displayed to demonstrate their use. There will be a sample service counter.

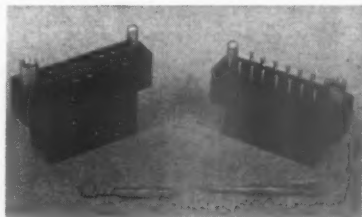
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JOHN HASSALL

▲ Designing for Cold Heading will be the theme in Booth 1639. Blow-ups of cold headed parts which have cut production costs will be accompanied by case histories. Sample parts such as rivets, threaded fasteners, specials will be available. Applications of cold forming which have cut scrappage will also be pictured.

Use postpaid card. Circle No. 20



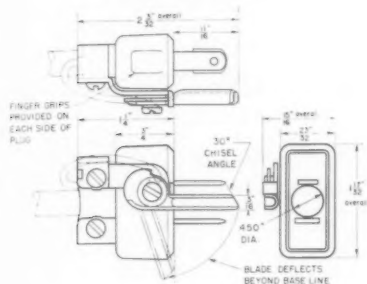
AMP INCORPORATED

▲ Electrical and electronic connecting devices will be featured in Booth 1303. AMPin-cert (pictured) is a line of rack and panel connectors incorporating solderless pins and sockets. They are furnished in M, D and W series to be interchangeable with current configuration. Maintainable Electronic Component Assemblies is a new modular

Assembly and Fastener Engineering

assembly technique with fully enclosed and encapsulated contacts and components. Printed Circuit Edge Connectors are friction type integral spring contacts with snap-in features permitting pre-termination to wiring harnesses.

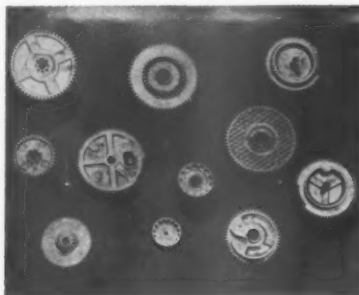
Use postpaid card. Circle No. 21



A.P.M. CORPORATION

▲ An automatic self-grounding electrical power connection will be introduced in Booth 915. The small, flat and armored plug has a special polarized grounding blade with a chisel-edge. When inserted into a 2-hole receptacle, the blade deflects to one side and the chisel-scraper makes a good contact with the faceplate of the receptacle. It is rated at 125 v. at 15 amps to 250 v. at 10 amps.

Use postpaid card. Circle No. 22



GRIES REPRODUCER

▲ Hundreds of zinc alloy die cast one-piece gear and pinion combinations available from stock dies will be displayed at Booth 2435. The small parts are made to AGMA standards for fine tooth $14\frac{1}{2}^\circ$ involute form gears with slight modifications. Parts are also made to specifications. Pictured above are the 11 gears made for the International Register Company's automatic range finder.

Use postpaid card. Circle No. 23

SYNTRON

Electromagnetic and vibratory parts feeders and their accessories will comprise a major part of the exhibit at Booth 2107. The devices may be incorporated wholly or in part in assembly equipment. Hopper level switches, flow control valves, spiral elevating feeders and other equipment will be demonstrated.

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Men who know and specify special fasteners depend on this familiar symbol . . . **CP** . . . the famous

Chandler hallmark for precision and reliability in fasteners. It's your guarantee that each fastener meets the rigorous materials and performance tests required by industrial and military standards. Before placing your next order . . .

check with chandler . . .



for precision cap screws!

	<p>Produced to your specifications . . . delivered to your requirements!</p> <p><i>Send for your Chandler catalog today.</i></p>		

CHANDLER PRODUCTS CORPORATION • 1543 Chardon Road • Cleveland 17, Ohio

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TRIMCLIP®

*over forty years of
industry leadership*

Do you have a fastener problem? TRIM-CLIPS have been widely known and used in the automotive, radio, stove, refrigeration and aircraft industries most extensively for attaching trim panels and mouldings to the structure.

Find out for yourself the many applications of TRIMCLIPS . . . by presenting us with your problem. Send sample section, if possible, otherwise full description and details.



GAGNIER

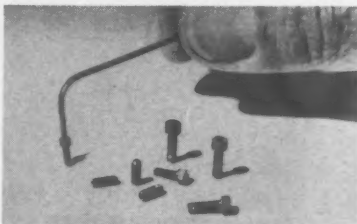
FIBRE PRODUCTS COMPANY

10151 Capital, Oak Park, Michigan

Phone JOrdan 6-7366

Use postpaid card. Circle No. 237

Design Engineering Show, continued



STANDARD PRESSED STEEL

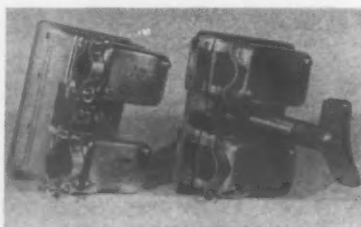
▲ New socket screws, self-locking screws, miniature shaft collars and automatic set screw driving machinery will be exhibited in Booth 2124. Pictured are miniature Unbrako socket screws with Nylok pellets in microsizes No. 0 to No. 4, being used in tool and die and machinery applications to check vibration. Model changes have also been made on the Setomatic which feeds, inserts and drives hex socket set screws up to 2500 per hour.

Use postpaid card. Circle No. 25

ANACONDA METAL

Stainless steel flexible hose assemblies will be exhibited in Booth 1236. A-X, a new assembly for expansion uses, will be featured. A display of sample assemblies will demonstrate engineering achievements in solving pipe problems such as misalignment, vibration, motion, flexing, temperature extremes, conveying corrosive fluids and gases.

Use postpaid card. Circle No. 26



DZUS FASTENER

▲ Quarter-turn fasteners in the standard, supersonic, panel and universal lines will be exhibited in Booth 735. In addition, quick release fasteners (pictured) will be demonstrated. The spiral cam parts are used for fastening hinged or removable components; holding tension varies from 20 lbs. for the 3/16" size to 65 lbs. for the 7/16" size. Available in both flush or oval types with full grommet.

Use postpaid card. Circle No. 27

REPUBLIC STEEL

The design possibilities of stainless and alloy steel tubing, bars, and flat rolled products will be demonstrated in Booth 2131. Of particular interest will be the display of carbon, alloy and stainless steel tubing and pipe, and the demonstration of properties. The booth will be staffed by metallurgists and experienced sales personnel to answer questions relating to the design

possibilities, selection, fabrication, and finishing of alloy and stainless steels.

Use postpaid card. Circle No. 28

PALNUT

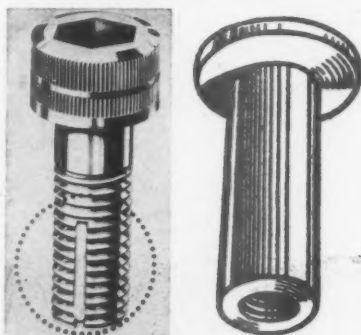
New sizes added to standard lines of wing and acorn nuts and push-on fasteners. Nuts which form their own threads while tightening on studs will be shown in Booth 306.

Use postpaid card. Circle No. 29

B. F. GOODRICH

Problem-solving applications of Riv-nuts—one piece blind rivets with internal threads—will be demonstrated in Booth 1403. Tooling used to upset the fastener, hole preparation, test data will be featured. Samples of the many head types will be available.

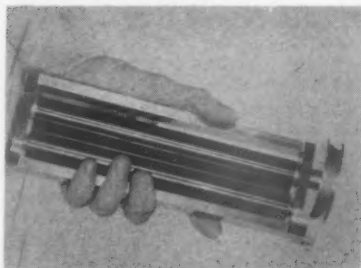
Use postpaid card. Circle No. 30



PARKER-KALON

▲ The new, companion P-K socket screw line with Long-Lok inserts will be shown in Booth 635. Superior thread engagement, high torsional resistance and a self-locking drag are reported from the new fastener design, available on cap screws, set screws, button heads, flat heads, shoulder screws and pipe plugs. The insert is made of Poly-cap, a nylon type polymer.

Use postpaid card. Circle No. 31



HUNTER SPRING

▲ Application possibilities for tube-shaped constant torque mechanical spring motors will be illustrated in Booth 1512. In addition, the new tensile tester for measuring the tensile strength of mechanical connections and thin materials will be exhibited. Model TJ is portable.

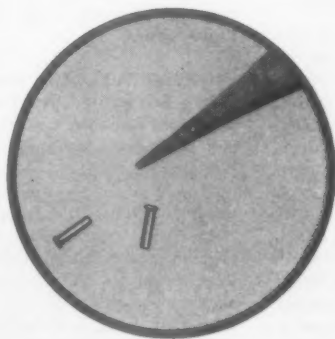
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**AS SMALL
AS 0 x 1/8
ALL TYPES
ALL MATERIALS
ALL FINISHES**



SMALL SCREWS

Special equipment and special engineering and tooling experience enable us to produce any desired quantities of close-tolerance screws in the smallest sizes, including body diameters down to No. 0 (.060") and lengths as short as 1/8". Quotations will be furnished promptly on request, engineering or design assistance available wherever needed. Some sizes are stocked. *Write for our Small Screw Stock List.*



SMALL COLD-HEADED PIECES

Likewise, our facilities are available for production of tiny cold-headed pieces of all kinds, one example being the little special rivets shown in comparison with a pencil point at the left. Here again, many years of design and engineering experience is available for the solution of production problems. *For suggestions, inquire of your Elco representative.*

ELCO TOOL AND SCREW CORPORATION
1101 SAMUELSON ROAD, ROCKFORD, ILLINOIS

CLECOMATIC

the automatic torque control tools
that made industry stop, look
and examine their methods
of setting screws, nuts,
and bolts.



Clecomatic No. 10 Series
Screwdriver-Nut-Runner



Clecomatic Right Angle Nut-Runner

Clecomatic* No. 10 Series Screwdriver—Nut-Runner: These are the tools that enable you to set torque to the most critical specifications . . . then forget it. Torque is positively maintained by a no-drift locking device. A long wearing, non-friction clutch is quickly adjusted when torque change is desired. *This is the only torque control air tool that starts and stops automatically!* Operator merely engages the screw with bit, the tool starts. When torque is reached, the tool stops. Motor operates only during rundown. Less air is used. Wear is reduced. There is no quality let-down at the end of a shift because control is in the tool. This tool has little impact, is shorter, and weighs less than competitive tools. No. 10 Clecomatic Screwdriver—Nut-Runners are available in pistol grip or straight handles in speeds

from 400 to 2,900 r.p.m. Reversible or non-reversible.

Clecomatic Right Angle Nut-Runners: You get uniform tightness in every nut or bolt rundown with a Clecomatic 14 or 16 Series Nut-Runner. Torque is preset. When specified foot pounds are reached, air is automatically shut-off at the driving spindle. The hazardous, tiring torque kick usually found in tools of this type is substantially reduced, your operators can produce more without extra effort. As for maintenance, there's practically none. Cleco's non-friction clutch operates for very long periods, completely maintenance free. Torque adjustment is made externally, no need to disassemble the tool. Clecomatic Nut-Runners are

available with both recessed socket heads and double-end spindles (reversible). Speeds range from 250 to 1,000 r.p.m.

IN PRODUCTION NOW! Clecomatic No. 6 Series Screwdriver—Nut-Runners: Essentially the same tool as the Clecomatic No. 10 Series—but smaller and lighter. No. 6 Series is equipped with the same unique torque control principle. The same automatic start and stop mechanism. They enable you to make even greater cost savings in the production line operations of automotive, aircraft, appliance, and electronic industries. Clecomatic No. 6 Series Screwdriver—Nut-Runners will be ready for delivery about May 1960.

To find out how big an improvement a Clecomatic can make in your operation, call your local Cleco® representative for a tryout-demonstration. For detailed literature, write:

A Division of REED ROLLER BIT COMPANY
P. O. BOX 2119 • HOUSTON 1, TEXAS
IN CANADA: Cleco Pneumatic Tool Company of Canada, Ltd.
927 Millwood Road, Leaside (Toronto), Ontario

*Trademark



WHAT'S NEW IN EQUIPMENT

For information on any equipment listed here, use the postpaid card opposite page 66. Just circle the number on the card matching the number following the description. We'll do the rest.



(See 38)

EXPAND FASTENER TESTING TEMPERATURE RANGE

Fastener-testing facilities have been expanded to include cryogenic and elevated temperature test chambers. Bolts, screws, nuts, rivets and similar structural parts can be tested through a temperature range of minus-320°F to 2000°F.

In addition to physical research and evaluation of threaded fasteners, the test facilities permit pursuit of planned auxiliary projects such as materials study programs and environmental evaluations of aircraft sub-systems and components.

Almay Research & Testing Corp., 3510 E. 14th St., Los Angeles 23, Calif.

Use postpaid card. Circle No. 35

UNIT PUNCHES SHAPED, ROUND HOLES

A self-contained unit has been designed to punch both round and shaped holes. Type CJ punches include holders and die bases keyed to take shapes. To punch shaped holes, shaped parts are substituted. Keying maintains positive, accurate alignment.

Wales Strippit Inc., 241 Buell Rd., Akron, New York.

Use postpaid card. Circle No. 36

AIR SCREWDRIVER PERMITS FAST PATTERN CHANGEOVER

Screw patterns can be quickly changed on the new R-A-F (rapid automatic fastening) screw driver by loosening and tightening only two bolts per powerhead. The machine drives practically any number of screws in any production pattern. The screw driver runs screws in 1½ seconds.

Three different power ranges are provided by three different Multi-Vane air motors for predetermined torque control. In each power range, the motors run to stall, driving screws to a preset, torque. Powerheads can be located as closely as 2" center-to-center and can be added or removed easily.

Column height measures only 42½"

for compact production line installation. Standard base measures 24" x 24" but larger bases can be furnished for mounting larger fixtures. Throat depth ranges from 8-5/32" to 14" from center line of powerhead to column. Powerhead stroke is adjustable up to 6" maximum.

Ingersoll-Rand Co., 11 Broadway, New York 4, N.Y.

Use postpaid card. Circle No. 37

PUSH BUTTON CONTROLLED BOOM TYPE FUSION WELDER

A fully automatic boom manipulator type fusion welder features push button control from the main control console station. The operator observes a weld in process by means of a TV closed circuit monitor.

Welding horizontally, and with a boom extension, the unit can produce an effective weld up to 12". Longitudinal welds in a vertical plane can begin 3' from floor level to 10'.

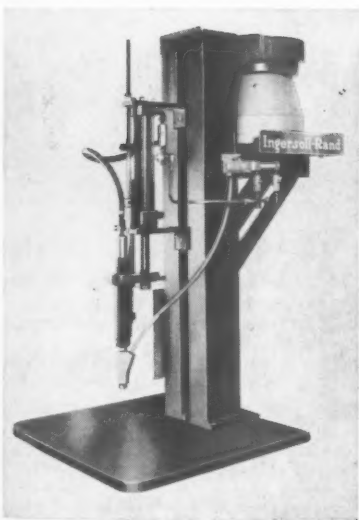
A special seam tracking system maintains alignment of the torch directly over the seam to be welded. It is capable of sensing a butt joint, then tracing this seam as the head moves. Also, a proximity transducer arrangement keeps the torch at a correct spacing with the work piece. Internal circumferential welds can be made automatically down to a 20" duct. Automatic 360° rotation of the weld torch and miniaturization of the head makes this possible.

Sciaky Bros., Inc., 4915 W. 67th St., Chicago 38, Ill.

Use postpaid card. Circle No. 38

SELF-FEEDING AIR TOOLS DRILL, TAP, FASTEN

Self-feed air tools perform automated drilling, tapping and fastening operations, with high production rates obtainable by single or multiple mountings. Up to 3000 holes per hour can be drilled automatically, set up in any desired number in a single fixture. These are available in capacities from 1/16" to ½", speeds from 500 to 20,000



(See 37)

Let NATIONAL RETAINING RINGS

simplify
your
designs!

National Retaining Rings have effected important economies in a wide range of applications from heavy duty machinery to toys. Elimination of machining, threading, nuts and cotter pins are typical advantages. In many applications, reduced space and weight requirements and substantial savings in material can be accomplished with these easy-to-install retaining rings.

TYPICAL APPLICATION

National Retaining Rings improve design of this electronic coupling. Assembly is faster, easier—saves time and money.

ENGINEERING ASSISTANCE

Send drawings or sample parts for suggestions on your specific design problems or write for illustrated literature on these cost-cutting retaining rings.

The NATIONAL LOCK WASHER COMPANY

Serving Industry Since 1886

NEWARK 5, NEW JERSEY • MILWAUKEE 2, WISCONSIN

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MATED PARTS help new pen

another
wonderful

GRC
idea

for designers



8 tiny parts die cast & molded by GRC for Esterbrook . . . precision "mated" to solve the intricate parts problem posed by new-type ballpoint pen

GRC molded 6 tiny parts in nylon and die cast 2 in zinc alloy to form the foundation of the new rotating mechanism evolved by Esterbrook engineers. The uniformity and accuracy of GRC's unique automatic single cavity die casting and molding methods made possible the precision mating of tiny parts . . . eliminated the necessity of selective assembly . . . assured trouble-free operation of the assembled pen . . . and again provided a new dimension to designers faced with a difficult situation. Write for detailed bulletins or send prints for quotation. Quick deliveries on quantities of 25,000 to millions.



25 years of
progress in
tiny parts

GRIES REPRODUCER CORP.

World's Foremost Producers of Small Die Castings
15 Second St., New Rochelle, N.Y. • NEW Rochelle 3-9600

Use postpaid card. Circle No. 241

**NO SIZE
TOO SMALL!**

Maximum
size:

Zinc Alloy
½ oz. 1¼"

Plastic
.03 oz. 1¼"

GRIES



rpm, stroke lengths from ¾" to 6".

Drilling and tapping can be combined in one fixture to eliminate costly handling. Self-feed tappers have capacities to ¼"—20 in mild steel, or larger holes in softer materials. Up to 2400 tapping operations per hour. Speeds of 500, 900, 1450 and 2700 rpm. Stroke lengths up to 1½". Threaded parts can be fastened at rates up to 3000 per hour with self-feed screw-driver-nutsetters. These are available in standard range of speeds for the most commonly specified screw sizes.

Aro Equipment Co., Bryan, Ohio.

Use postpaid card. Circle No. 39

DUTCH-MADE RESISTANCE WELDING ELECTRODES



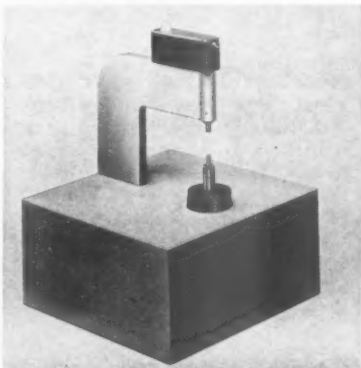
Resistance welding electrodes are made to U.S. RWMA standards and to user specifications by the Dutch firm Handelsonderneming Weld-Equip.

Both straight and bent electrodes of various copper alloys are made from round, square hex and flat bar material, forged blocks, discs, rings and castings.

The Netherlands Trade Commission, 551 Fifth Ave., New York 17, N.Y.

Use postpaid card. Circle No. 40

SEMI-AUTOMATIC TERMINAL SWAGING MACHINE



A semi-automatic swaging machine for setting turret terminals is used on both printed wiring and conventional circuit boards.

The machine works with pre-loaded boards. The operator places each terminal into the upper receiver, where it is aligned and swaged pneumatically. The TSM-11 is equipped with a transistorized electronic timer. Swaging time is adjustable.

Delbert Blinn Co., 440 W. Monterey Ave., Pomona, Calif.

Use postpaid card. Circle No. 41

Assembly and Fastener Engineering

3/4" AIR IMPACT WRENCH WEIGHS ONLY 5 3/4 LBS.



A pneumatic impact wrench has a 3/4" bolt capacity, weighs 5 3/4 lbs. and is equipped with a cam actuated throttle valve requiring light finger pressure only.

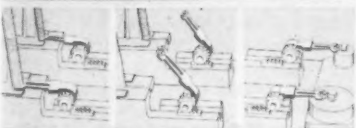
Drive shanks are bearing supported and motors are locked in. For areas where air line lubrication is not available, an oil reservoir in the handle contains an oil metering unit. Rundown is 7100 rpm.

The wrench has only two impacting parts. The motor housing and hand grip are of reinforced aluminum alloy. Three models are available in shank sizes of 1/2", 3/8" and 7/16" Hex Fem.

Master Power Corp., 13 Krick Rd., Bedford, Ohio.

Use postpaid card. Circle No. 42

AUTOMATIC RETAINING RING ASSEMBLY MACHINE



An automatic retaining ring assembly machine is intended for Truarc radially-installed crescent rings, E-rings and reinforced E-rings. It can be adapted to a variety of operations.

While each Ring-O-Mat is designed to install only one ring, more than one unit can be mounted in the same fixture.

Work is placed in a nest in the fixture, and the machine either foot or hand activated. Tools grasp the bottom



LUG TYPE FASTENERS



KNURLED
SHOULDER FASTENERS



SPECIAL HEADS



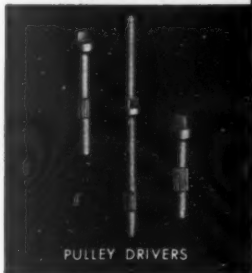
MOLD INSERTS



DRIVE INSERTS



ROUND COLLAR
THREADED STUDS



PULLEY DRIVERS



SPECIAL SLOTTING



SPECIAL SEMS

HUBBELL COLD HEADING MAKES THEM FASTER AND BETTER

Small fasteners like these Hubbell cold headed parts represent an area of saving often overlooked by management, who give careful attention to the cost and design of major components and little or none to the parts that hold them together. Yet here is the area where savings can be effected most easily and quickly.

Why pay for special tolerances and secondary operations when Hubbell engineers can design and mass produce a cold headed part that is stronger, cheaper and more uniform. For example, all of the above, and thousands more like them, have

been specially designed for Hubbell cold heading. And each one helped to make the end product faster and better.

Investigate for yourself. Simply send us a blueprint of the part or a sample for analysis. Our engineers will gladly estimate.



This quality can be your greatest production economy. For standards or specials, call Bridgeport, EDison 3-1181.



Quality

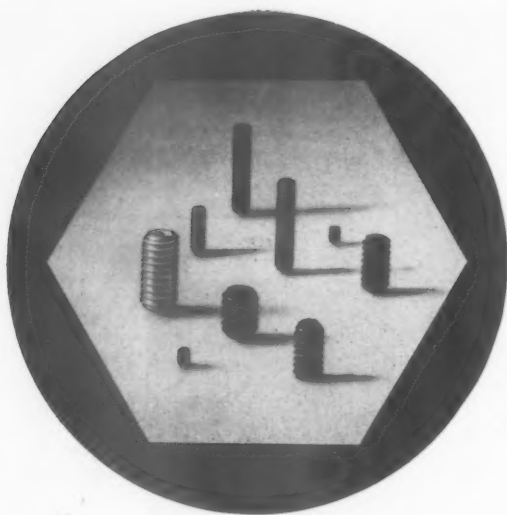
FASTENERS

HARVEY HUBBELL, INCORPORATED

Machine Screw Department, Bridgeport 2, Connecticut

See the Hubbell Fastener Catalog in Sweet's Product Design File 7/Hu.

Use postpaid card. Circle No. 242



TEALESOCKET Set Screws are the result of years of experience. Their immediate and wide acceptance on the industrial market resulted in a meteoric rise of the line, along with other Teale products.

The first reason for this success lies in Tealesocket quality: strict Class III A threads, rigidly controlled dimensions, quality heat treating meeting Government specs and high class finishes.

The second reason is Teale specialization in 5,000 minimum bulk shipments resulting in economical prices never before quoted.

Finally, Teale maintains an impressive and well balanced stock for immediate shipments even in "hard to get" sizes and shapes. More than 1200 items are constantly available!

Ask for catalog and stock list—Moly Steel Alloy—Stainless.

TEALESOCKET SET SCREWS



TEALE MACHINE COMPANY • 1425 University Ave. • Rochester, N.Y.

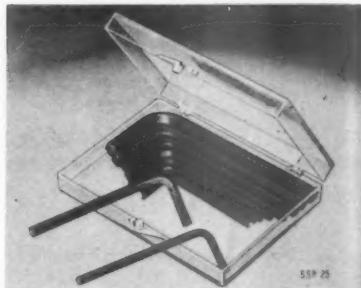
Use postpaid card. Circle No. 243

rings on the dispenser brackets, make a 180° arc for installation, then flip back.

Waldes Kohinoor, Inc., 47-16 Austel Pl., Long Island City 1, N.Y.

Use postpaid card. Circle No. 43

TOOL STEEL HEX KEYS FOR 1960 SERIES CAP SCREWS



Two new hex keys for the new 1960 type cap screws which replace the 36 series are required for cap screw sizes 6 & 8 which have both been changed in the socket dimensions.

Setko hex socket keys are made of alloy tool steel and isothermal heat treated for maximum strength without brittleness. The new key sizes are 7/64" and 9/64" and are available as a part of a set of eleven boxed in a clear plastic, break resistant container. All eleven hex keys can be used for all types of hex socket screws.

Set Screw & Mfg. Co., Bartlett, Ill.

Use postpaid card. Circle No. 44

RIVET GUN PERMITS QUICK, BLIND ASSEMBLY



A riveting gun permits the user to insert and crimp rivets from the same side, without having to get behind blind work surfaces.

The Snapo is used for almost all sheet metal and mechanical assemblies. Simple to handle and light in weight—only 1 pound, 7 ounces—the gun can be easily operated with one hand. Its clinching action pulls parts together with up to 600 pounds of force. Counter-sunk heads leave a flush surface for easy finishing. A minimum number of rivet sizes covers almost all applications.

Another strong advantage is that the rivets can be easily removed, if necessary, by merely placing an electric drill to the head of the rivet, which causes it to fly apart. A new area can then be worked.

Richline Co., 1531 E. Franklin Ave., Minneapolis, Minn.

Use postpaid card. Circle No. 45

SQUARE PLUNGER, PUSH ACTION TOGGLE CLAMPS



The C-150 series of square plunger, push action toggle clamps comes in 3 standard sizes: $\frac{1}{2}$ ", $\frac{3}{4}$ " and 1".

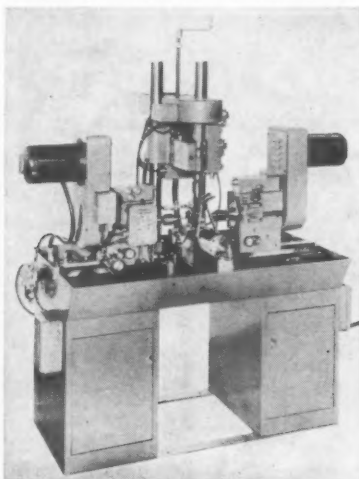
Important features include: positive radial location of the plunger about its axis, even with normal pin wear; large surface area of the square plunger that extends service life; and the ease with which adapter pads can be mounted to the flat surfaces of the plunger. Note that the broached guide holes and close plunger tolerance fit permit accurate locating as well as clamping action.

This C-150 Series offers maximum loads up to 10,000 lbs.—two types of base mounting—black oxide finish—heavy body sections—pins riveted flush.

Wolverine Tool Co., 1480 E. Woodbridge St., Detroit 7, Michigan.

Use postpaid card. Circle No. 46

TRIPLE SPINDLE MACHINE DRILLS, TAPS AND THREADS



A high speed fully automatic triple spindle machine is designed for secondary operations on screw machine and headed parts, die castings, stampings and molded plastic parts.

The machine has two horizontally opposed spindle units and one vertical spindle unit. Each unit can be cycled individually and automatically, in any combination with the other two units, allowing varied sequence to suit the job.

Each unit has an individual spindle drive motor with speeds ranging from 500 to 10,000 rpm. Dove-tail mounting permits 11" major adjustment of indi-

ALLEN

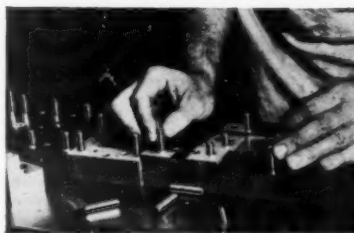


ALLEN is the dowel pin that gives you PLUSES!

Your ALLEN Industrial Distributor can show you a good many ways to use ALLEN Dowel Pins, in addition to conventional uses in tool and die work. You can use them as economical roller bearings, axles, precision plugs, hinge and wrist pins—and in many other ways.

You can cut the cost of your product substantially, too—because your ALLEN Distributor can supply these strong, accurate, mirror-finished Dowel Pins in standard sizes right from stock.

Made of special Allenoy steel; surface hardened to 62-64 Rockwell C; precision ground to .0001" with micro-inch finish of 6 RMS max. Check your Allen Handbook or Catalog for detailed specs and standard sizes, or write direct for samples and technical information.



Genuine ALLEN products are available only through your ALLEN Distributor—he's always ready, willing and able to give you prompt, practical service.



ALLEN MANUFACTURING COMPANY

HARTFORD 1, CONNECTICUT, U.S.A.

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vidual heads plus 2½" of spindle stroke control.

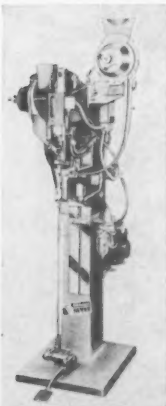
Spindles are advanced and retracted by twin double acting air cylinders complete with intake and exhaust air metering controls, air pressure regulator and gauge, operating on shop air supply (15 to 100 psi as required). The electrical control circuit is 110 volts.

Capacity is .020" to ¾" drilling and/or up to ¾" tapping in mild steel.

Universal - Automatic Corporation, 9545 Ainslie Street, Schiller Park, Ill.

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UNIT SETS RIVET THRU WORK, INTO WASHER

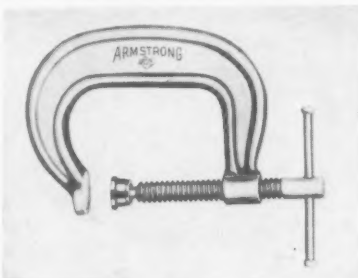


An automatic riveting machine simultaneously positions a tubular rivet through an assembly and into a washer, the latter providing a strong metal area for the rolled clinch. The machine is an adaptation of a cutlery rivet setter. It rivets light metals and any other material where the added protection of a washer is desired.

Chicago Rivet & Machine Co., 950 S. 25th Ave., Bellwood, Illinois.

Use postpaid card. Circle No. 48

IMPROVE SWIVEL PAD ON DEEP THROATED C-CLAMPS



A new style swivel pad has been developed for a line of deep throated drop-forged C-clamps.

The pad is attached to the screw by forcing the recessed lip of the pad opening down, forming a solid steel wall encircling the ball of the screw. This prevents the pad from coming off in normal use, but allows 40° of swivel.

The 400 series is available in capacities 0 to 1½" through 4" to 12".

Armstrong Bros. Tool Co., 5200 W. Armstrong Ave., Chicago 46, Ill.

Use postpaid card. Circle No. 49

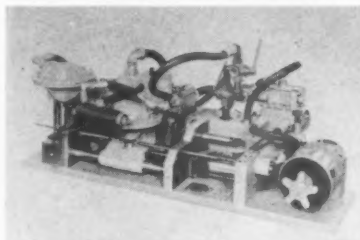
STEEL PARTS BINS FABRICATED IN 24 MODELS

Designed for orderly indexed storage of a variety of parts, bins are available in 24 different models. Bin dividers, drawer dividers, and shelves are adjustable. The forest green baked enamel

finish is applied over an iron phosphate rust inhibitor. Construction is of steel. Bay Products Inc., 1827 W. Cambria St., Philadelphia, Pa.

Use postpaid card. Circle No. 50

UNIT FEEDS, CUTS OFF WIRE TO .002" ACCURACY



Wire is measured, fed and cut off to an accuracy of .002" on the Ses-Matic machine. The unit is adjustable to cut off wire in increments from 1 to 6" length, and adjustable in cut offs per minute.

For feeding and cutting fine wire, a pay-off spool (with drag brake) is mounted directly on the feed unit base. No adjustment is necessary when changing from one wire size to another within the range of the unit.

Units for wire sizes up to 3/16" and stroke lengths from 1 to 24" are also available. Wire straighteners are optional.

Special Engineering Service, Inc., 7630 Wyoming, Dearborn, Mich.

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RELIABLE CONNECTIONS



New funnel flange eyelets for PW board connections. Speeds wire insertion, solves solder problems. Automatically fed and set on United machines.



Feeding and setting 6 eyelets from both sides of machine at once. Backed by more than 50 years' experience.

Unlimited opportunities for savings as connectors, fasteners, terminals, bushings, contacts for switches and many other applications are yours with United Eyelets. Only United gives you a wide choice of standardized sizes plus special designs for cutting costs on tough problems plus most versatile line of eyelet setting machines available.

For maximum production at minimum installed costs, call or write us today. Nation-wide organization ready to help with your most challenging problem.



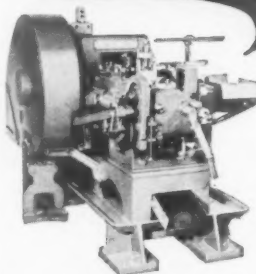
FREE Eyelet Calculator. Speeds selection for design, purchasing, and production men. Write for yours today.

See us at the Design Engineering Show Booth 924 New York Coliseum, May 23-26

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BEHR SINGLE and DOUBLE STROKE COLD HEADERS FOR UPSETTING AND FORGING BOLTS, SCREWS, RIVET HEADS AND OTHER SIMILAR SHAPES!



**175
PIECES
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DSSD**

Capacity of wire, 1/4"; Stroke, 3"; Maximum length of cut-off, 2-7/8"; Maximum length of blank under head, 2"; Diameter and length of heading die, 1-3/4" x 2-1/2"; Diameter of finished punch, 1-1/4" x 2-1/4" long; Speed - Number of pieces per minute, 175; Number of strokes per minute, 350; Lubrication, Force Feed; Weight, 6000 lbs.; Overall dimensions, 81" x 46" x 51"; Motor, 7-1/2 HP, 3 phase, 60 cycle, 220/440 volts. Each header complete with motor, push button station, and foot brake.

MANVILLE 250C HEADER PARTS AVAILABLE FROM STOCK

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MACHINERY & EQUIPMENT CORP.
1210 SEMINARY ST.
ROCKFORD, ILLINOIS

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Assembly and Fastener Engineering

AIR TOOL DRIVES UP TO 7000 PARTS PER HOUR



Screws up to 2" in length are automatically driven to pre-determined torque with a power assembly tool system. Rivets, studs and pins can also be metered, from between 4000 and 7000 parts per hour.

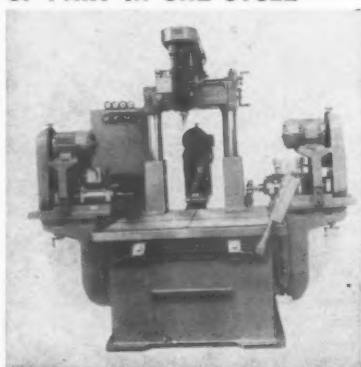
Tru-Tork incorporates a pneumatic screwdriver, hopper feed and plastic feed tube. The operator can work up to 50 feet from the hopper, with only 40 lbs. of air required. In operation, the screw itself acts as the pilot to center the screwdriver on the hole.

In applications such as cabinet work, mobile home floors and going through several sheets of aluminum, it is not necessary to predrill holes.

Clyde Engineering & Mfg. Corp., 937 E. 10 Mile Rd., Madison Hts., Mich.

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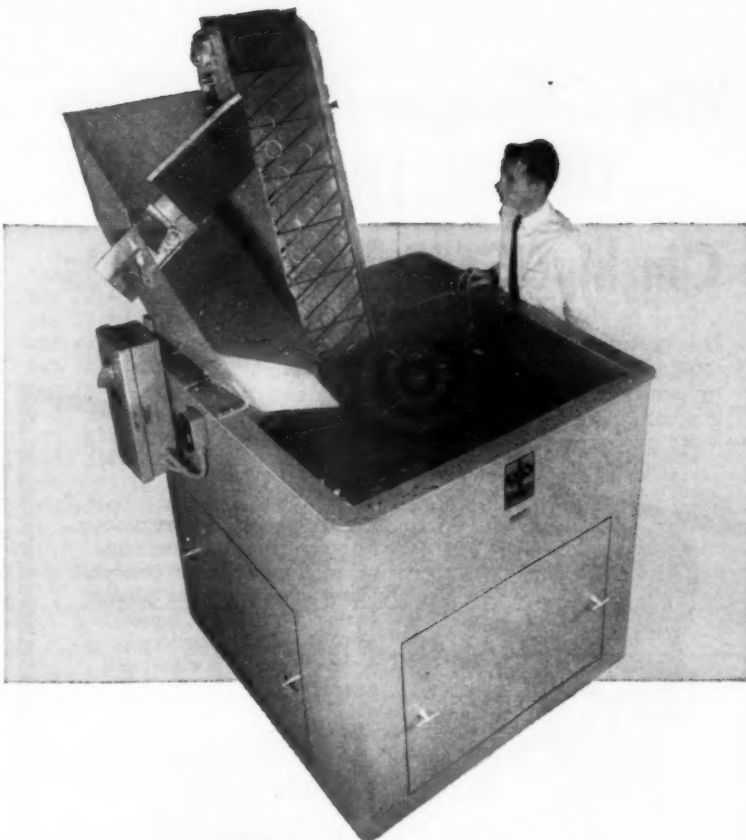
UNIT WORKS ON FIVE SIDES OF PART IN ONE CYCLE



A drilling, tapping, boring, reaming and spot-facing machine will perform operations on as many as five sides of a piece part in one work cycle. The Wis-Matic is available with any combination of one to four horizontal power units and one vertical power unit. All are adjustable in vertical, lateral and longitudinal planes.

Instantaneous change-over from drilling to reverse tapping can be made from the master control station for any power unit.

The machine is designed to take package tooling as provided by the manufacturer. It consists of a holding fixture mounted to base plate. The multiple-spindle drilling or tapping



How **DPS** elevating feeders elevate, orient, feed your parts to cut production costs

New elevating feeders from Detroit Power Screwdriver Company—

- Eliminate hand feeding
- Permit high-speed feeding and orienting
- Discharge parts at height to suit your requirements
- Offer adequate holding capacity

The output of hand-fed production machinery soars with DPS elevating feeders. Parts of almost any size, shape and material can be fed quickly, gently, in a continuous flow to other machinery for processing and assembly.

Three standard sizes available: 6, 12 and 20 cu. ft. holding capacities. Larger or smaller units can be fabricated to meet special requirements.



NEW BULLETIN

... has complete information on new DPS elevating feeders. Mail the coupon today!

15,333



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DETROIT POWER SCREWDRIVER COMPANY

2815 W. Fort St., Detroit 16, Michigan

Send new Elevating Feeder Folder 2812.

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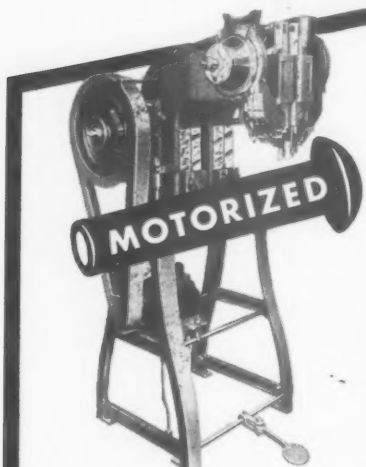
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Why *Chicago Rivet* Offers TWO METHODS for Clinching Semi-Tubular Rivets

It is part of a widening service based upon industry's recognition that an assembly held together by semi-tubular rivets has great inherent strength and is usually lowest in production cost.



The Chicago Rivet **MOTORIZED AUTOMATIC RIVET SETTER** produces a sharp, solid blow that immediately upsets the tubular section. This method is used on 95% of all applications involving metals or non-fragile materials.



The Chicago Rivet **AIRPOWERED RIVETER** produces a cushioned, shock-free clinch on a tubular rivet, permitting riveting of fragile and uneven materials. This method has greatly widened the use of semi-tubular rivets.

FOR YOUR FILES



RIVET CATALOG describes 1388 standard tubular and split rivets and 25 single and multiple motorized automatic rivet setters.



AIR-POWERED RIVETING catalog contains description and specifications of 8 single and multiple riveters—also rivet setters designed for automated operation.

Why not let Chicago Rivet Fastening Engineers tell you which system is best for you. No obligation.

MOTORIZED

Line includes automatic single, multiple and automated setters.

AIR-POWERED

Line includes automatic single, multiple and automated setters.

**Chicago Rivet
& MACHINE CO.**

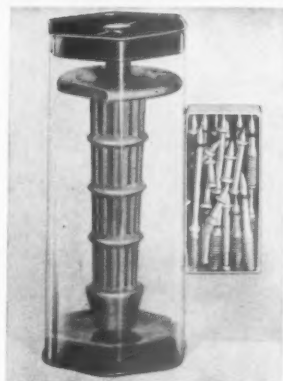
946 So. 25th Ave., Bellwood, Ill.
(Chicago Suburb) Branch Factory:
Tyrone, Pa.

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heads are mounted to guide bars.
Wisconsin Drill Head Co., Butler,
Wisconsin.

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KIT FOR DRIVING PINS, STUDS IN STEEL, MASONRY



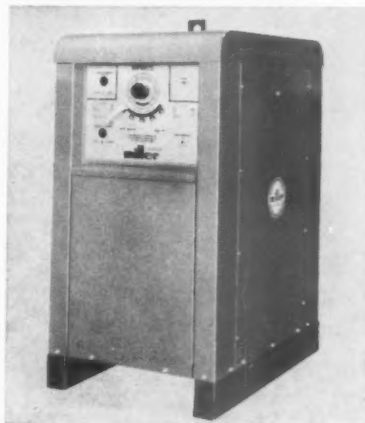
The Ham-R-Tool kit for anchoring pins and studs into steel, concrete, brick or mortar includes 11 sizes of plain and threaded fasteners and a driving tool.

Heat treated, plated, sharp pins in 1/4-20, 10-24 and 8-32 sizes are driven by a two-piece tool without changing barrels with a few hammer blows. Price is \$7.98.

Fastway Fastener, Inc., 1676 E. 28th St., Lorain, Ohio.

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TIG WELDER OFFERS ENTIRE RANGE BALANCE



A TIG welder offers balance throughout the entire welding range, even during crater elimination, plus arc stability without high frequency at as low as 18 amp.

Five separate welding ranges are featured in model BWC-300MAP. The d-c component is completely removed, resulting from a new concept in balanced wave welder circuits and specially designed transformer.

A fail-safe voltage reducer automatically lowers the open circuit voltage when arc is struck or broken.

Miller Electric Mfg. Co., Inc., Appleton, Wisconsin.

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assembly and fastener engineering

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221	222	223	224	225	226	227	228	229	230
231	232	233	234	235	236	237	238	239	240
241	242	243	244	245	246	247	248	249	250
251	252	253	254	255	256	257	258	259	260
261	262	263	264	265	266	267	268	269	270
271	272	273	274	275	276	277	278	279	280
281	282	283	284	285	286	287	288	289	290
291	292	293	294	295	296	297	298	299	300
301	302	303	304	305	306	307	308	309	310

EDITORIAL ITEMS

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100
101	102	103	104	105	106	107	108	109	110
111	112	113	114	115	116	117	118	119	120
121	122	123	124	125	126	127	128	129	130
131	132	133	134	135	136	137	138	139	140
141	142	143	144	145	146	147	148	149	150
151	152	153	154	155	156	157	158	159	160

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221	222	223	224	225	226	227	228	229	230
231	232	233	234	235	236	237	238	239	240
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251	252	253	254	255	256	257	258	259	260
261	262	263	264	265	266	267	268	269	270
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281	282	283	284	285	286	287	288	289	290
291	292	293	294	295	296	297	298	299	300
301	302	303	304	305	306	307	308	309	310

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1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
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91	92	93	94	95	96	97	98	99	100
101	102	103	104	105	106	107	108	109	110
111	112	113	114	115	116	117	118	119	120
121	122	123	124	125	126	127	128	129	130
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151	152	153	154	155	156	157	158	159	160

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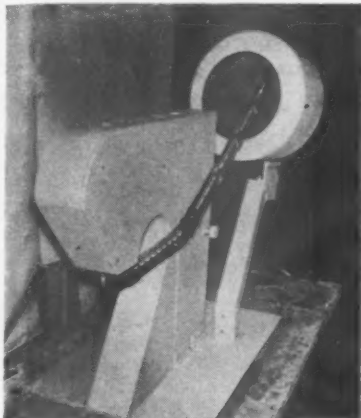
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PARTS POSITIONER TEAMS WITH PARTS FEEDER



A parts positioner takes parts from a feed track and places them into nests, work stations, auxiliary machines.

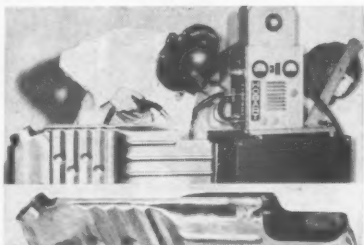
Coupled with a parts feeder, the positioner replaces manual insertion of parts under the ram of a press or screwdriver. The cycle of the unit can be made fully automatic or semi-automatic.

Varied parts can be handled. Production speed is adjustable and rates of over 5400 cycles per hour have been reported.

Aidlin Automation, Inc., 1613 E. New York Ave., Brooklyn 12, N.Y.

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MICRO-WIRE WELDING FOR LIGHT GAUGE SHEET METAL



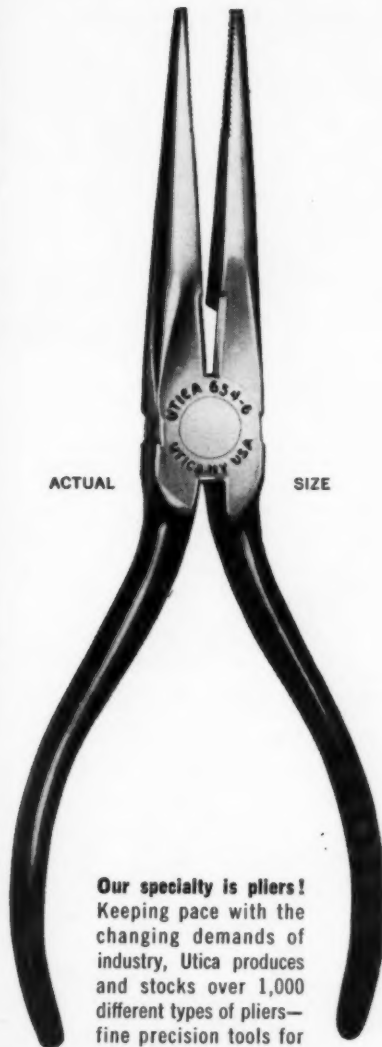
Micro-wire welding is a new automatic welding process developed for carbon dioxide shielded arc welding of mild steel from 24 gauge to $\frac{1}{4}$ ".

The process was named for the small .020" to .045" diameter welding wire that is fed continuously from a spool into the weld zone. Equipment for the process includes a lightweight gun-cable assembly, a wire feed unit, gas supply and regulation apparatus, and a power source of the constant voltage.

The gun of the gun-cable assembly is kept cool by atmospheric air and does not require water and heavy water hoses for cooling. The cable of the gun-cable assembly is new to the industry, being designed specially for the process. All wire feeding facilities, gas tubes and wires are contained inside one extruded cable jacket which measures only $\frac{3}{4}$ " in diameter. The small diameter of the cable makes it light, extremely flexible and easy for the

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Our specialty is pliers!

Keeping pace with the changing demands of industry, Utica produces and stocks over 1,000 different types of pliers—fine precision tools for every conceivable use. Because of the job we have been able to do in many of the country's largest and most specialized plants, we believe that Utica tools can help you, too—either reduce your costs or improve your products. Contact your Utica distributor, today.

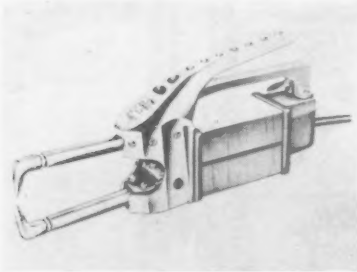
Utica Drop Forge & Tool Division, Kelsey-Hayes Company, Utica 4, N. Y.

tools the experts use!

Use postpaid card. Circle No. 249

operator to manipulate the gun.
Hobart Brothers Co., Troy, Ohio.
Use postpaid card. Circle No. 57

PORTABLE SPOT WELDERS FOR UP TO 1/4" STEEL



Two portable spot welders are designed for use on mild steel, stainless steel, and galvanized iron up to 1/8" combined thickness.

The units weigh 24 pounds. Model 11 operates from 115 volts AC and requires 3.3 kva. Model 23 requires 230-volt AC power and is rated at 4.4 kva. The design features a fixed top tong which permits one-hand operation of the unit relieving the other hand to position the work. The top tong rests the weight of the unit on the exact spot to be welded, giving added contact pressure for a sound weld and reducing operator fatigue.

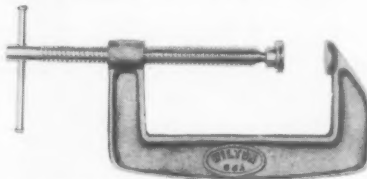
Metal & Thermit Corp., Rahway, N.J.
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AUTOMATIC FLUX DISPENSER ELIMINATES WASTE

An automatic liquid flux dispenser mixes flux with acetylene in the exact amount for the pressure and tip size being used. The flux forms a vapor which saturates the gas and goes right on with the acetylene into the flame and out on the work. There is no waste. Brazing liquids made for the Mark III Jet Flux Dispenser are the standard for maintenance brazing and Super Clean for production.

All-State Welding Alloys Co. Inc.,
249 Ferris Ave., White Plains, N.Y.
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C-CLAMPS FOR LIGHT INDUSTRIAL APPLICATIONS

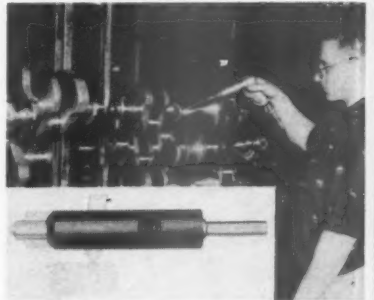


A series of C-clamps is designed for service in light applications. The five different-sized units in the 200 Series have clamp swivels guaranteed never to come off. Capacities range from 3" to 10" with standard depth range from 1 1/8" to 3 3/8". Minimum proof test ranges from 2000 to 4000 lbs.

Wilton Tool Mfg. Co. Inc., Schiller Park, Illinois.

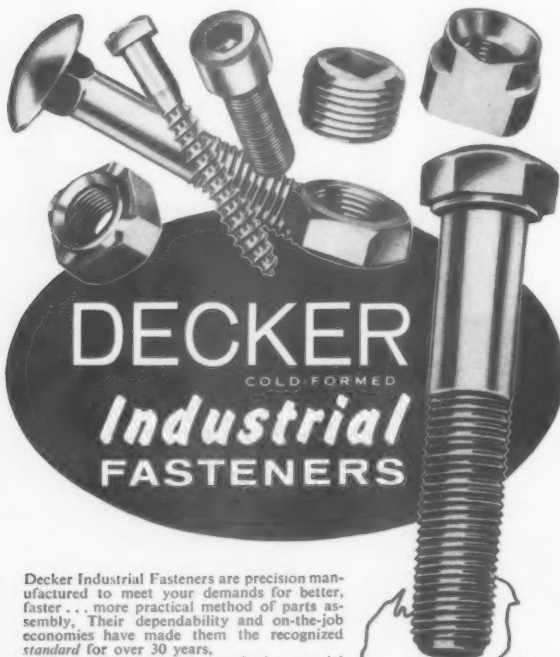
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DEBURRING TOOL FOR ANGULARLY DRILLED HOLES



A tool has been developed for deburring and chamfering irregular hole surfaces such as those obtained by drilling into a cylindrical surface or angular plane. The Ellipti-Bur automatically follows the hole configuration.

A conical pilot is directed in the hole using a low-speed, portable air drill motor. The deburring operation may be performed as parts progress along a conveyor line or while palletized between successive machine stations. Once the pilot is seated, the two-lipped cutter is independently free to follow a consistently changing surface pattern.



DECKER COLD-FORMED Industrial FASTENERS

Decker Industrial Fasteners are precision manufactured to meet your demands for better, faster... more practical method of parts assembly. Their dependability and on-the-job economies have made them the recognized standard for over 30 years.

Whatever your need in standard or special fasteners, Decker is ready to serve you quickly and effectively on any quantity—type or size.

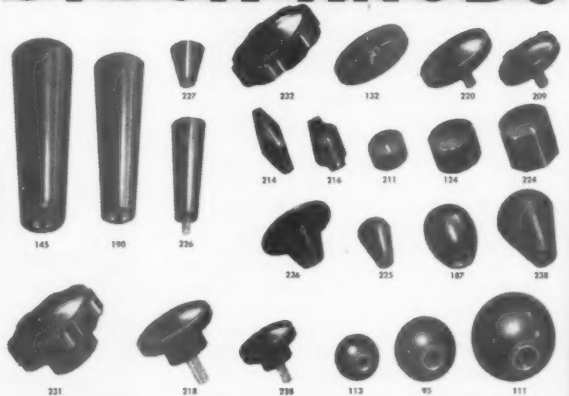
Write today for your copy of
the big, new Decker catalog.

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1900 N. Clark Road • ALBION, MICHIGAN

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LOCATED

Use postpaid card. Circle No. 250

STOCK KNOBS ...NO TOOLING CHARGE! STOCK KNOBS



Wide selection molded plastic knobs, handles, hand-wheels at no tooling charge! Minor changes (inserts, threads, color, etc.) to suit requirements. Other modifications give your part a look of exclusive design at fraction of new mold cost! Write for complete illustrated catalog, or see Sweet's Product Design Catalog File.

DIMCO-GRAY COMPANY
210 EAST SIXTH STREET — DAYTON 2, OHIO

Use postpaid card. Circle No. 251

Assembly and Fastener Engineering

A specially-designed cutter which "floats" in the central tool body prevents motion from being transferred up to the operator's hand.

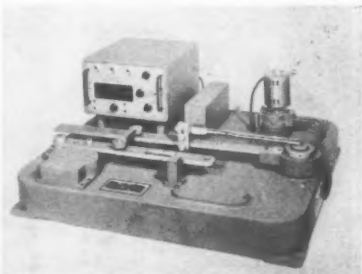
Nobur Mfg. Co., 6860 Farmdale Ave., North Hollywood, Calif.

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TORQUE-WRENCH CALIBRATOR WITH WIDE CAP.

Designed to rapidly load and read out the actual "break-away" value of torque wrenches of any design, the Model TWC-139 torque-wrench calibrator uses a conventional proving ring as a load measuring standard.

For most torque-wrench designs, operation is automatic. The wrench is inserted in the mechanism, and load



links and range of the electronic digital counter are set for the correct range. The tang is rotated by a hydraulic piston and cylinder assembly. At the break-away point of the wrench, the counter displays the torque value in either inch-pounds or foot-pounds.

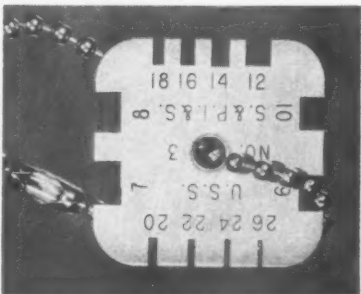
The digital counter translates the linear displacement of the proving ring into torque values with a calibration accuracy of 0.4% of full scale. It can calibrate torque wrenches with capacities from 20-inch-lbs. to 2000 foot-lbs.

An adjustable thrust arm can be positioned for any usual length of torque wrench, and four interchangeable socket inserts accommodate standard wrench tangs.

Steel City Testing Machines, Inc., 8817 Lyndon Ave., Detroit 38, Mich.

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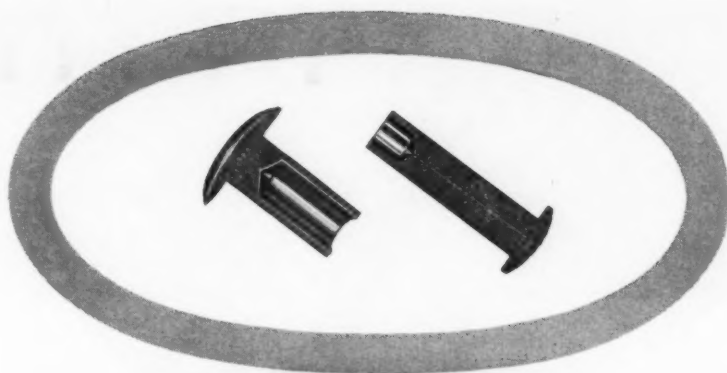
STEEL GAUGE FITS ON KEY CHAIN



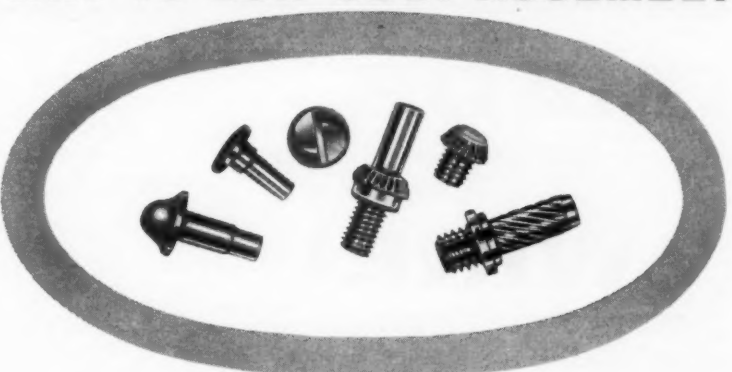
A steel gauge made of stainless steel fits on a key chain. Machine tooled gauge—it is calibrated in the 12 most used gauges from 26 to 7 gauge.

Columbus Hydraulics, Columbus, Nebraska.

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COST PREVENTION...NOT COST REDUCTION...IS THE EFFICIENT WAY TO LOW-COST ASSEMBLY



The "in-place" cost of a fastener is what really counts to cost-conscious production men. By deciding on inexpensive Milford tubular rivets as a fastening method and installing them with Milford automatic rivet-setting machines, design and production engineers are eliminating costs at the initial production stage rather than trying to reduce costs later at the assembly line.

You can find out more about Milford's cost-cutting ideas by asking your Milford Representative to show you Milford's new **MANUAL OF MODERN RIVETING PRACTICE**. It's crammed with valuable cost-cutting tips and technical data that can be quickly translated into dollars on your production line.



MILFORD RIVET & MACHINE CO.

MILFORD, CONNECTICUT • NORWALK, CALIFORNIA
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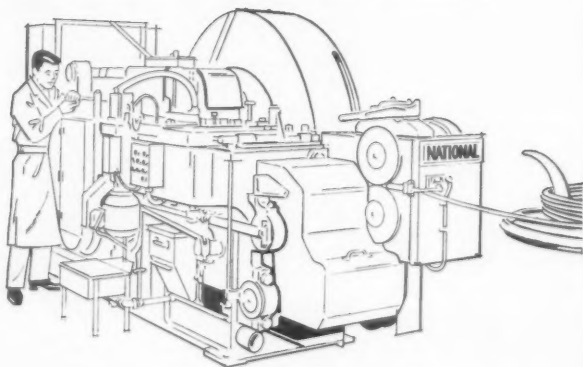
MADE FROM WIRE!

BOLTMAKERS make these interesting parts, and countless others, every day from wire.

Operations include cutting off, extruding, heading, trimming, pointing and thread-rolling.

It's just possible *your* metal parts can be made faster, stronger and at lower cost in Boltmakers (or in other types of Nationals).

May we help you investigate?



NATIONAL 1/2-INCH BOLTMAKER
4,200 PARTS PER HOUR!

Founded 1874—DESIGNERS and BUILDERS of MODERN FORGING MACHINES • MAXIPRESSES • REDUCEROLLS • COLD HEADERS BOLTMAKERS • NUT FORMERS • TAPPERS • NAILMAKERS CO-PIONEERS WITH INDUSTRY OF ADVANCED METALWORKING PRODUCTION METHODS

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WHAT'S NEW IN FASTENING AND JOINING

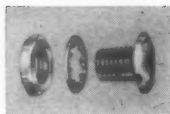
For further information on any of the fasteners or methods listed here, use the handy postpaid card opposite page 66.



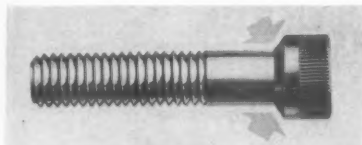
(See 65)



(See 68)



(See 69)



(See 67)



(See 66)

CHEMICAL-TREATED SPONGE TINS METAL SURFACES

A sponge impregnated with tinning metals, chemical cleaner and a flux is used for tinning metal surfaces before soldering.

Tin Swipe is simply wiped across the metal surface. Heat is applied and at soldering temperatures a smooth, complete coating of tin appears.

Surface preparation is limited to wiping off dirt and grease. When soldering copper or galvanized fittings, the sponge is wiped on the end of the tubing. The inside of the fitting is wiped and pieces joined. Solder is applied in the usual manner.

Wright Mfg. Co., 1900 Euclid Ave., Cleveland, Ohio.

Use postpaid card, Circle No. 65

EPOXY RESIN CEMENT FOR GENERAL-PURPOSE BONDING

Epoxy resin compounds are finding increased bonding applications in electrical equipment manufacturing, in addition to general purpose use.

In the pictured application, Metalset A-4 is being used to create a seal for washers on the terminal conductors of a 75 kw electrical resistance heater.

The cement is packaged in tubes of identical size and weight to permit simple one-for-one mixing of the two components. The user mixes only the precise amount required for each application.

Smooth-On Mfg. Co., Jersey City, New Jersey.

Use postpaid card, Circle No. 66

CAP SCREW HEAD TAPER IMPROVES EFFICIENCY

A basic change in socket head cap screw design incorporates a taper rather than a straight flange in the head. An overall 27% improvement in working efficiency is reported.

The IB series have 17% more bearing surface without an increase in head size. There is 14% less resultant compression since the taper changes the direction of stresses. Corner fatigue is virtually eliminated. The greater lock-

ing effect requires 12 to 23% more torque to release.

The fastener is standard in all regular sizes in diameters from No. 4 through 1½".

Mac-it Parts Co., Liberty St., Lancaster, Pennsylvania.

Use postpaid card, Circle No. 67

DISHED LOCK WASHER WITH SPRING TAKE-UP

A dished lock washer combines the locking action of a toothed lock washer with the spring take-up of a cone washer. The spring take-up compensates for large differentials in expansion between plastics or die cast materials and the steel in the screw.

In addition, the fastener's burr-free flat rim prevents scoring of surfaces.

The part can be furnished as a free washer or in Sems and Keps assemblies, recommended for substitution for a flat washer being used with a split ring washer. It can be made small enough to fit confined areas.

Shakeproof Division, Illinois Tool Works, St. Charles Rd., Elgin, Ill.

Use postpaid card, Circle No. 68

PANEL BUSHING ASSEMBLY FOR ¼" DIAMETERS

A panel bushing assembly has been added to a line of electronic components.

The No. 1818 assembly, designed to accommodate ¼" diameters, includes a nickel-plated hex-ended bushing, hex nut and internal tooth lock washer. It comes in lengths of ⅜", ½" and ⅝" with ¼-28 UNF Thread.

Cambridge Thermionic Corp., 445 Concord Ave., Cambridge 38, Mass.

Use postpaid card, Circle No. 69

ALLOY FOR PROGRESSIVE STEP BRAZING METHOD

A high-temperature controlled atmosphere brazing alloy is composed of copper, nickel and boron and reportedly has greater strength than standard copper brazing alloys.

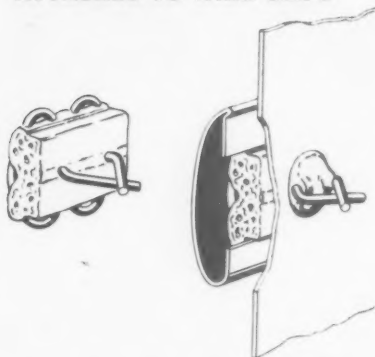
The new alloy is useful in progressive step brazing techniques. This

procedure allows the pre-frabrication of brazed components and the subsequent assembly into a composite unit by furnace brazing methods.

Superweld Corp., 6840 Vineland Ave., North Hollywood, Calif.

Use postpaid card. Circle No. 70

SPONGE SEALING DEVICE ATTACHES TO WIRE CLIPS



A sponge-like device can be attached to any of an existing line of wire clip fasteners to effect sealing action.

The molded vinyl plastisol sponge can be adapted to Trimclips to prevent leaks and water seepage into the product body. Water is not absorbed by the substance because of its closed cell structure.

Gagnier Fibre Products, 10151 Capital St., Oak Park, Mich.

Use postpaid card. Circle No. 71

FLUSH TYPE LATCHES MEET MIL STANDARDS

Missile-Air aircraft, flush type latches meet or exceed all requirements of MIL-E-5272A, according to environmental tests performed by American Laboratories.

Featuring over-the-center positive action, the latches require only fingertip pressure to open. Fail-safe construction prevents accidental opening.

Double sealing gaskets around aluminum alloy push buttons assure minimum leakage from pressure differential. The frames of the 1 3/4 oz. latches are of stainless steel.

Missile-Air Division, United States Chemical Milling Corp., 1700 Rosecrans Ave., Manhattan Beach, Calif.

Use postpaid card. Circle No. 72

RATCHET TERMINALS SPEED CIRCUIT BOARD ASSEMBLY

Ratchet terminals are simply pushed into 1/16" cards with .101" holes. The terminal jaws hold component leads securely without pre-forming leads, feeding through holes or wrapping around a post.

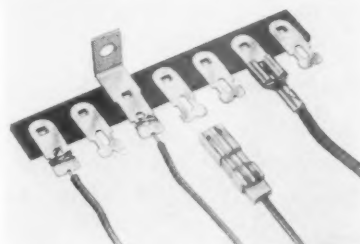
For experimental circuitry, both components and terminals can be snapped out and re-used. For production equipment, the terminals are staked either by hand or automatic methods. Components can be mounted in place and soldered on a production basis.

Heat is dissipated in the terminal, permitting use of short, space-saving leads with less danger of heat damaging components. The terminals are part of an integrated system of mounting and wiring components.

Alden Products Co., 117 N. Main St., Brockton, Massachusetts.

Use postpaid card. Circle No. 73

LUG TERMINAL STRIPS COMBINE THREE FUNCTIONS



Universal lug terminal strips are designed to combine the functions of three separate terminal strips.

The .205" width of the lug is a suitable male for the junior size, quick-disconnect female. The inside slot is provided for tie-point terminations. The side notches are provided for wrap-solder terminations.

Where the tie-point or wrap-solder method is used, the notch at the end of the terminal holds the first wire when dressed back. Each subsequent



Industry's NEWEST Production TOOL MOLYKOTE® G LUBRICANT

- ALMOST 100% SAFETY AGAINST GALLING AND SEIZING WITH ALL BEARING METAL COMBINATIONS
- ELIMINATES STICK-SLIP, METAL PICK-UP AND DISTORTION IN PRESS FITTING
- REDUCES WEAR-IN TIME AND DAMAGE IN NEW OR REBUILT MACHINERY
- THE HIGHER THE LOADS, THE GREATER THE MARGIN OF SUPERIORITY OF MOLYKOTE G

Write for your free sample of MOLYKOTE G LUBRICANT today. We will also send you a copy of our new Bulletin 126 which gives complete details. THE ALPHA MOLYKOTE CORPORATION, 65 Harvard Avenue, Stamford, Conn. Phone FR 5-3724. Plants in Stamford, Conn., Munich, Germany and Strasbourg, France.

THE ALPHA MOLYKOTE CORP.
65 Harvard Ave., Stamford, Conn.
Please send me a free sample of your MOLYKOTE G Lubricant.

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COMPANY _____
ADDRESS _____
CITY _____ ZONE _____ STATE _____



Use postpaid card. Circle No. 254

NEW line of STANDARD PLASTI-GROMMETS® CUTS FASTENING COSTS



Using Fastex Plasti-Grommets to mount license plates demonstrates their use in blind applications, just one of their unique solutions to individual or mass-production fastening problems. They snap into place easily, lock tight when the screw is driven.

FASTEX

A DIVISION OF ILLINOIS TOOL WORKS
195 Algonquin Road, Des Plaines, Illinois
In Canada: SHAKEPROOF/FASTEX
Division of Canada Illinois Tools Ltd.,
Don Mills, Ontario

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TIMELY BOOKLET!



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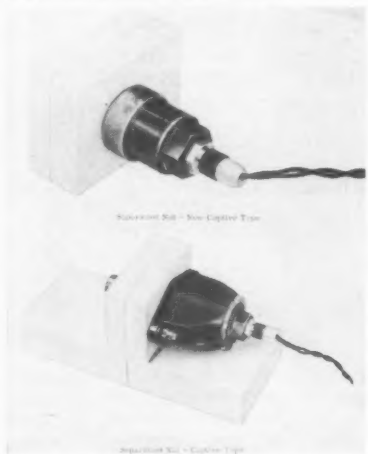
Assembly and Fastener Engineering

wire locates itself for inspection.

Mandex Mfg. Co., Inc., Dept. AE-3,
2614 W. 48th St., Chicago 32, Ill.

Use postpaid card. Circle No. 74

EXPLOSIVE SEPARATION NUT FOR MISSILE SYSTEMS



A fastening device for missile separation systems differs from conventional explosive bolts by combining mechanical separation activated by a small explosive charge.

The separation nut includes a mechanical nut, a squib containing a low energy explosive and a connector to the electrical system for detonation. The non-captive type separates from the bolt or stud, while the captive type attaches to the structure and contains all fragments or component parts following detonation.

The nut is used in combination with standard diameter, grip length bolts (160,000-180,000 psi tensile) at full strength allowables.

Hi-Shear Rivet Tool Co., 2600 W. 247th St., Torrance, Calif.

Use postpaid card. Circle No. 75

REINFORCED TERMINALS FOR HIGH VIBRATION DUTY



A line of solderless electrical terminals has been strengthened by a seamless, annealed, tin-plated brass sleeve permanently attached over the regular terminal barrel. The Vibra-krimp is designed for excessive vibration applications.

The skirt of the sleeve extends beyond the barrel and is crimped in the same operation as the barrel to permanently grip the wire insulation, preventing creep.

Airflex®
PRECISION RIVETERS

**TAKE THE
TOUGH
JOBS**

**High Frequency
IMPACT
with Spinning**

Airflex® Riveters bring an entirely new technique to the field of fastening. Riveting now becomes feasible under conditions that previously made it impractical.

Wherever tolerances or riveting pressures are critical, or assemblies and materials are apt to distort or fracture, the Airflex® *cold-flow* principle has provided the solution. Selective tolerances as close as .002" between peened end of the rivet and the material are being maintained even on volume production. Materials impose no limitations—glass, ceramics and plastics can also be riveted economically. Capacity for steel rivets range from 3/32" to 1". Silver, aluminum, brass, copper, titanium rivets also—hollow or solid—from 1/16".

Airflex® Riveters can give you faster, better riveting on routine jobs—and the economy of riveting on the "impossible" jobs. Write now for complete information.

AIRFLEX® PRINCIPLE combines high frequency blows with a spinning action to *cold-flow* the rivet. Force and rate of impacts, duration of impacts and spinning speed are independently controlled. Operator training is cut to a minimum.

LEMERT ENGINEERING CO., INC.
191 E. JEFFERSON ST., PLYMOUTH, IND.

Airflex®

RIVETERS DIMPLERS

Use postpaid card. Circle No. 256

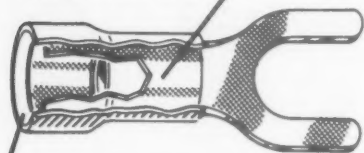
Terminals come in all tongue types: ring, hook, spade, flanged spade and rectangular. The $\frac{1}{4}$ " minimum barrel length eliminates squeeze-outs and shearing, allows a wider crimp for strong connections.

ETC Incorporated, 990 E. 67th St., Cleveland 3, Ohio.

Use postpaid card. Circle No. 76

PLATED, NYLON-INSULATED SOLDERLESS TERMINALS

Plated Brass Sleeve



Nylon Insulating Sleeve

Avikrimp construction style has been designed into a line of solderless terminals. Annealed, tin-plated brass sleeves add extra barrel strength and permanently anchor the wire insulation to the terminal.

A permanently-attached nylon sleeve extends beyond the metal support sleeve, eliminating the need for extra insulation. Samples.

Waldom Electronics Inc., 4625 W. 53rd St., Chicago 32, Ill.

Use postpaid card. Circle No. 77

BRIGHT ALUMINUM ALLOY IS CORROSION RESISTANT

An aluminum alloy is reported to be the brightest, most corrosion resistant alloy ever made available to the appliance and automotive industries.

Alloy 5657 is a high-purity, non-heat treatable metal. It is easily formed and available in the same dimensions, finishes, gauges and tempers as alloy 5457 in flat sheet and coils. A test measuring diffused reflectance components shows alloy 5657 to be 15% brighter than 5457 with a .2 mil anodic coating, 26% brighter with a .1 mil coating.

Reynolds Metals Co., Richmond 18, Virginia.

Use postpaid card. Circle No. 78

SODIUM PREPARES TEFLON SURFACES FOR BONDING

A simplified surface treatment permits bonding of materials to Teflon and other fluorocarbon resins. Sodium solution Chem-Etch permits the typically slick surface of Teflon to be converted chemically so that adhesives will adhere to it with a high bond strength.

The part to be treated is immersed in Chem-Etch from 5 to 60 seconds. After this application, the Teflon becomes brownish in color and can be bonded to itself, metals, plastics, glass, ceramics, or wood with various adhesives. The film deposit left by a

Chem-Etch treatment anchors the adhesives to the Teflon. A wide variety of common adhesives can be used, including chlorinated rubber types, resorcinol formaldehyde cements, as well as epoxies.

Chemengineers, Inc. 4570 Brazil St., Los Angeles 39, California.

Use postpaid card. Circle No. 79

BONDING WITH RESIN, HEAT AND PRESSURE



Similar or dissimilar materials—metal, rubber, plastic, etc.—are permanently bonded by a process using resin, heat and pressure. Automatic, variable speed bonding machinery can be custom designed for specific applications.

"Hotshot" bonding is suitable to all sizes, shapes and quantities of components. The process is specially suitable to bonding brake linings and transmission bands for automotive equipment, clutches and brakes for industrial

**This new
"100% solids"
epoxy adhesive
flows like a
heavy-bodied
motor oil**



BONDMASTER M648T ("T" for "thin") is as easy to handle as any 10,000 cps fluid—can be applied by brush, spatula, roller, or similar conventional equipment.

This solvent-free adhesive is 100%-reactive—there's no wait for solvent evaporation... the glue line thickness you put down won't shrink, either during cure or after it.

BONDMASTER M648T

CURES AT ROOM TEMPERATURE

The bond is strong enough to be handled in from 4 to 6 hours; about 85% of maximum strength in less than one day. (Can be heat-cured in minutes.)

Write for detailed Data Sheets and Technical Article reprints.

RUBBER & ASBESTOS CORP.
224 BELLEVILLE AVE., BLOOMFIELD, N. J.

Use postpaid card. Circle No. 257

need **DRIV-LOK** grooved pins in **SPECIAL MATERIALS?**



aluminum

alloy steel-heat treated

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bronze

DRIV-LOK Pins — the positive locking, solid steel body grooved fasteners — are also available in a variety of special materials to meet particular requirements of strength, corrosion resistance, electrical qualities, or combinations of these properties. Like all DRIV-LOK Pins, they are carefully made to exacting standards, are easy to install and will reduce your fastening and assembly costs.

Write us, describing your fastening requirements. Recommendations made and catalog sent without obligation.

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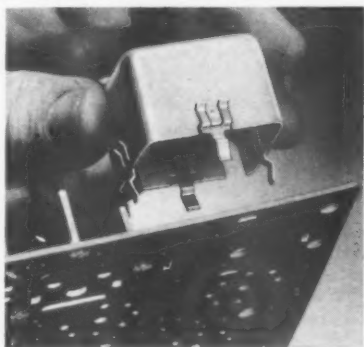
Assembly and Fastener Engineering

presses and off the road construction equipment.

Spanish Bonding & Welding Corp.,
Box 2121, Livonia, Mich.

Use postpaid card. Circle No. 80

SPRING CLIPS ATTACH SHIELDING CANS TO BOARDS



Spring clips for attaching shielding cans are made in chain form on reels for rapid machine application.

The clips of .016" pre-timed brass can be applied to any shape or size of can in configurations compatible with printed boards. Clips are fed, cut off and dimpled onto the can in one operation. Four clips per can can be attached at rates up to 500 cans per hour.

Once soldered to the board, the clips still permit easy removal of the cans, as well as re-insertion without loss of clip spring or retention ability.

Malco Mfg. Co., 4025 W. Lake St., Chicago, Illinois.

Use postpaid card. Circle No. 81

HI-TEMP THREAD COMPOUND LUBRICATES, SEALS PARTS



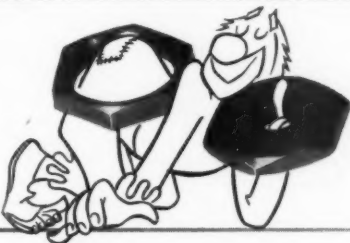
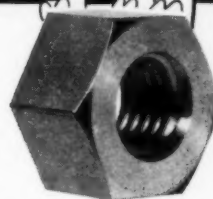
An anti-seize thread compound lubricates and seals bolts, studs, flanges and other parts at high pressures and temperatures to 1800°F.

Fel-Pro C5-A, available in cans and tubes, is a colloidal copper composition which actually plates metals, metal alloys and plastics. It can be used in below freezing water, is non-settling, non-hardening and homogenized.



RANGE OF SIZES AND THREADS

Here you see the smallest and largest hex sizes produced by Fischer with the finest and coarsest standard threads. The miniature is $\frac{1}{8}$ " x $\frac{3}{64}$ " with 0-80 threads... jumbo is $1\frac{1}{16}$ " x $\frac{39}{64}$ " with $\frac{5}{8}$ -11 threads.

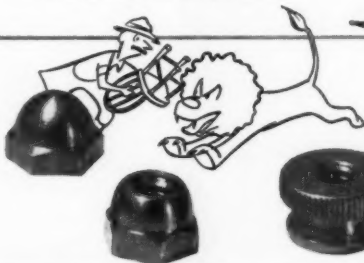
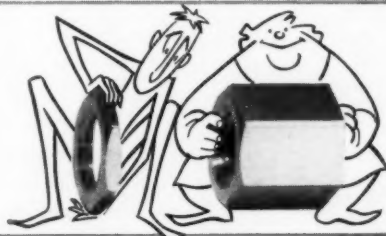


RANGE OF THREAD DIAMETERS

Turned from $1\frac{3}{16}$ " hex stock, these nuts illustrate variation in I.D. obtainable in same blank size (depending on thread specified). One is $1\frac{1}{16}$ " I.D., the other only $\frac{1}{4}$ ".

RANGE OF LENGTHS

Both these nuts are $\frac{3}{8}$ " O.D. with $\frac{1}{16}$ " thread diameter. The husky one is $\frac{3}{4}$ " long, the other $\frac{1}{2}$ ". In specific nut sizes, maximum length is determined by thread pitch and thread I.D.



RANGE OF STANDARD TYPES

In addition to hexagon nuts, Fischer also supplies cap (acorn), open-end cap, knurled thumb, battery and fixture nuts in a range of sizes with standard/special threads.

ODD SIZES, SHAPES & THREADS

... are another specialty with Fischer. In fact, we have produced more than 3400 different types of non-standard brass and aluminum nuts. What do you need?

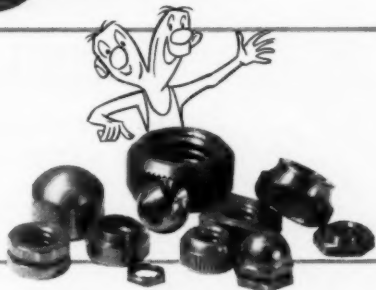


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FISCHER IS THE LEADING PRODUCERS OF PRECISION TURNED BRASS AND ALUMINUM NUTS... TO YOUR SPECIFICATIONS!

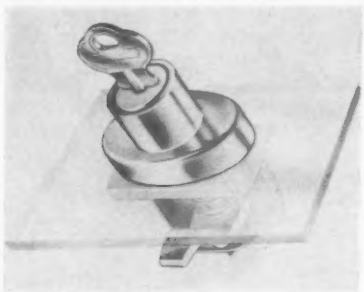
Whatever your requirement, Fischer can assure you of premium quality and prompt "on schedule" deliveries at competitive prices. WRITE FOR CATALOG FS-1000.

8105-FB

Felt Products Mfg. Co., 7450 N. McCormick Blvd., Skokie, Ill.

Use postpaid card. Circle No. 82

ADJUSTABLE PAWL FASTENER WITH LOCKING ASSEMBLY



Fasteners combining a locking assembly with adjustable pawl pull-up are suited for instruments, especially gasketed high voltage equipment, tape and paper machines, small safes, hospital equipment, vending machines and on liquor cabinets in airplanes, for example.

The dust-proof, vibration-resistant fasteners are easily installed. Simply drill or punch three holes and insert two screws. The screws are hidden so that they can not be removed from the outside. To operate, insert the key and turn until the pawl grips panel firmly. The key can be removed at any

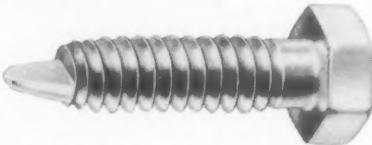
90° position. It has a special broad shank to provide sufficient torque without distortion.

Locking Adjustable Pawl Fasteners are made in two different basic sizes. The No. 14 has four grip ranges from .125" to 1.500"; No. 44, three grip ranges from .125" to 1.125". A broad variety of door panel thicknesses can be accommodated.

Southco Division, South Chester Corporation, Lester, Pa.

Use postpaid card. Circle No. 83

SELF-TAPPING SCREW ALSO DRILLS OWN HOLE



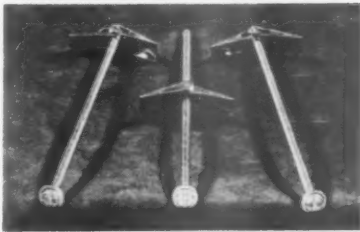
A screw for use in sheet metal, plastic and wood, drills and taps its own hole and is designed for both manual and power assembly.

The fastener can be preassembled with various plain, special, lock and sealing washers. Many problems in drilling, positioning and hole matching can be eliminated since the part makes its own hole.

Reliance Div., Eaton Manufacturing Co., Massillon, Ohio.

Use postpaid card. Circle No. 84

LONGER DRIVING SLOTS FOR TOGGLE BOLT HEADS



Button head toggle bolts in the 1/8" size now have a newly-designed head. Diameter has been increased 10% without increase in height to allow a 15% longer four-way screwdriver slot area, without the tapering away of the slot at the edge of the head. This is expected to be a time-saver during installation.

The Paine Co., 10 Westgate Rd., Addison, Illinois.

Use postpaid card. Circle No. 85

HIGH-TENSILE, LOW FUMING BRONZE BRAZING ALLOY

Available in both bare and flux coated form, a low fuming bronze brazing alloy is designed for general purpose welding and brazing. Its low melting point allows free flow and produces a weld deposit of high tensile strength. It meets all A.W.S., A.S.T.M. and Federal specifications. This rod also is for fusion welding and surface build-up. An oxyacetylene welding and braz-



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everyone's fancy
turns to
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**WIRE FORMS—SPRINGS
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- Types of Flux and application.

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LUCAS-MILHAUPT Engineering Co.

5060 South Lake Drive, Cudahy, Wisconsin

Use postpaid card. Circle No. 261

Assembly and Fastener Engineering

ing rod, it is degasified and deoxidized for low fuming characteristics.

American Brazing Alloys Corp., P.O. Box 11, Pelham, New York.

Use postpaid card. Circle No. 86

ALUMINUM FOIL BONDS TO PLASTICS, WOOD PRODUCTS

Aluminum foil, coated with an adhesive which bonds it permanently to plastics, plywood, and other wood products, has become available commercially.

When bonded integrally to wood or plastic products, the coated foil may serve as a moisture barrier, decorative element, a base for paint, a light reflector, a strengthening agent, or a disperser of heat. Bonding to other materials is accomplished under heat and pressure usually in a hot press.

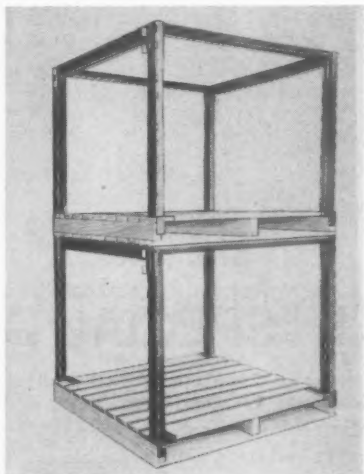
The foil development became feasible when Polymer Industries, Inc., Springdale, Conn., created Dri-Line, an adhesive coating which anchors extremely well to any aluminum surface.

Coated on one or both sides the foil will be available in gauges down to .001", and in widths up to 50".

Aluminum Company of America, 734 Alcoa Building, Pittsburgh 19, Pa.

Use postpaid card. Circle No. 87

HARDWARE TURNS PALLETS INTO PORTABLE RACKS



A line of hardware that converts standard pallets into portable racks features interchangeable components which can be fitted to any pallet. A Lock-Tight assembly bites into the pallet for added security.

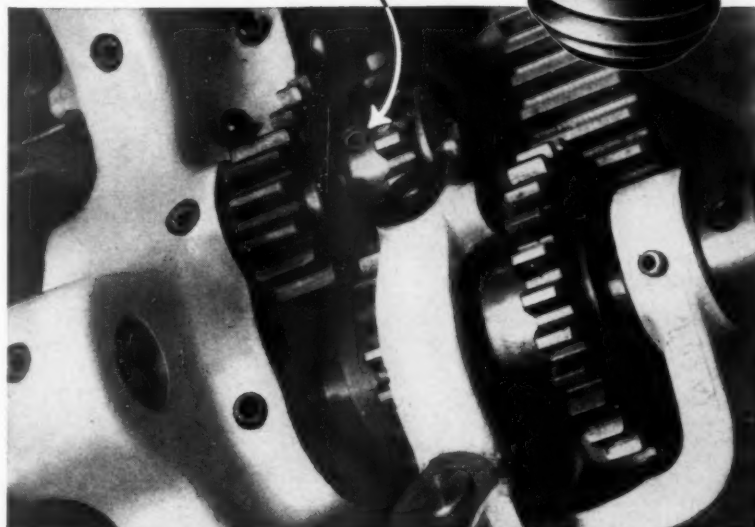
The pallets can be safely stacked ceiling high, can handle loads up to 12,000 pounds per stack and be handled with all types of lift trucks and dollies. By use of extra support bars, each rack can be compartmentalized to handle a differentiated load. Quickly disassembled, Pallet Racker units store flat.

Sturdi-Bilt Material Handling Division, Union Asbestos & Rubber Co., 332 South Michigan Ave., Chicago 4, Ill.

Use postpaid card. Circle No. 88

Dimensionally Controlled Heat Treatment

gives Mac-it screws extra strength here



Speed, vibration, stress are tough operating conditions that extra strong, extra resilient Mac-it set screws handle with amazing ease. These high quality screws are made of special pre-tested alloy steel, produced with clean, sharp, fully formed threads and points.

Controlled heat treatments, based on material, physical dimensions and end-use, mean that Mac-it set screws resist up-setting of the points and rounding out or splitting of the hex

sockets. This guarantees screws that can be set and re-set again and again with confidence. They are available with cup, flat, cone, oval and dog points so that you can select exactly the style you need.

The interest, skill and care of Mac-it specialists is your assurance that every Mac-it screw will give you the service you want—every time. That's why we say, choose Mac-its . . . they hold tight in tight places!

Buy by name from your distributor—buy Mac-it.

NEW SPECIFICATION SHEET listing now 1960 Series Industry Dimension Standards for socket head cap screws. Write for your free copy.

Mac-it Parts Co., Dept. 20, Lancaster, Pa.



MAC-IT ALLOY STEEL SCREWS

Use postpaid card. Circle No. 262

USEFUL LITERATURE

To receive your copy of any literature reviewed here, use the postpaid card opposite page 66.

POWER TOOLS

A full line of screwdrivers and nut runners, an impact wrench and accessories is included in 64-page 1960 Catalog. Three types of clutches are described and specified. Illustrated. A price schedule is attached. Skil Corp., 5033 Elston Ave., Chicago 30, Ill.

Use postpaid card. Circle No. 100

ULTRASONIC WELDING

Equipment for seam and spot ultrasonic welding, examples of work and an explanation of the new process is dealt with in an eight-page illustrated brochure. Typical weld strengths for various metals are charted and the combinations of weldable dissimilar metals are listed. Sonobond, Corp., West Chester, Pa.

Use postpaid card. Circle No. 101

THREADER INSERTS

Specifications and application data on Banc-Lok self-locking inserts and tapped holes are presented in an eight-page catalog. Charts detail thread and hole sizes and grip lengths. The threaded inserts are used in plastics, sheet metal and composition materials. The Boots Corp., Newtown Turnpike, Norwalk, Conn.

Use postpaid card. Circle No. 102

WELDING STAINLESS STEEL

Common problems in the welding of stainless steels are discussed in question and answer form. Illustrations and graphs are included in the 10-page pocket-sized guide. Arcos Corp., 1500 S. 50th St., Philadelphia 43, Pa.

Use postpaid card. Circle No. 103

ADHESIVES

Products are cross-indexed by military specification data, by type, function and industrial application in a manual. Tapes, bulk adhesives, coatings and other pressure sensitive products are cataloged. Mystik Adhesive

Products, Inc., 2635 N. Kildare Ave., Chicago 39, Ill.

Use postpaid card. Circle No. 104

GROUND TERMINAL SCREW

A 10-24 terminal screw for electrical grounding protection is pictured and described in a one-page flyer. The fastener has a pre-assembled tab washer, reaming point and thread-cutting feature. Shakeproof Div., Illinois Tool Works, St. Charles Rd., Elgin, Ill.

Use postpaid card. Circle No. 105

CONTAINER LATCH

A data sheet describes the Hook-Lock latching device for use on military cases and commercial containers. The positive-locking, springless latch lies flat against mounting surfaces open or closed. Dimensions given. Simmons Fastener Corp., North Broadway, Albany 1, New York.

Use postpaid card. Circle No. 106

ALUMINUM ALLOYS

A guide to the selection of aluminum alloys is contained in a 24-page booklet. Physical properties, fabrication characteristics, strengths, tempers, finishes and patterns are various topics discussed in charts, text and illustrations. Metals Div., Olin Mathieson Chemical Corp., 400 Park Ave., New York 22, New York.

Use postpaid card. Circle No. 107

SELECTING AN-ANS BOLTS

Catalog 600 has been prepared as a guide to the selection of bolts and special fasteners for the aircraft, missile and avionic industries. A 40-page catalog includes 18 pages of AN and NAS aircraft bolt standards for quick reference. There are an additional 12 pages of availability charts referencing AN and NAS hex head bolts, NAS external and internal wrenching bolts, close-head tolerance, corrosion resistant



(See 100)



(See 101)



(See 102)

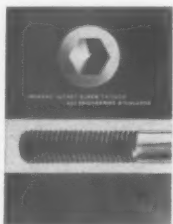
and A286 non magnetic aircraft quality bolts. Aircraft Bolt Corp., 543 Monterey Pass Road, Monterey Park, Calif.

Use postpaid card. Circle No. 108

SOLDERLESS TERMINALS

Fourteen types of solderless terminals and connectors are available in five construction styles. Complete specifications and net prices are listed in 14-page Bulletin 5E9. A handy chart cross-references all types with five other brands. Waldom Electronics Inc., 4625 W. 53rd St., Chicago 32, Ill.

Use postpaid card. Circle No. 109



SOCKET SCREW GUIDE

An 82-page technical reference on industrial socket screws includes both standard catalog data and extensive design and performance information. "Unbrako Socket Screw Catalog and Engineering Standards" covers more than 2800 items: socket head cap screws, set screws, shoulder screws, button head screws, pressure plugs and

socket screw keys. Additional product lines reviewed are Unbrako square head set screws and dowel pins. It assembles into three distinct sections of one volume: 1) Basic information on size, material and availability—in tabular form. 2) A 33-page section of basic design and performance information. 3) A simplified technology of fasteners. Standard Pressed Steel Co., Box 1121, Jenkintown, Pa.

Use postpaid card. Circle No. 111

SPOT, PROJECTION WELDERS

A 12-page brochure (8-413) describes 32 multi-spot and projection resistance welding machines in detail. Data include: end product, type of operation, production rate, welding machine specifications, and material handling equipment. Automatic loading, inspection, special welding techniques, spot, projection, and seam welds, resistance brazing and hot upsetting operations and automatic transfer are features covered. Taylor-Winfield, Warren, O.

Use postpaid card. Circle No. 112

BRAZING STAINLESS STEEL

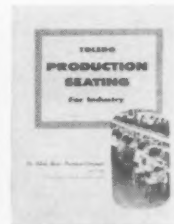
A 15-page reprint of a technical paper by H. M. Webber details the brazing of stainless steel. Instructions in cleaning, fits, designing fixtures, selecting gases, cycling and other phases are presented. Aerobrazo Corp., 30012 Lakeland Blvd., Wickliffe, Ohio.

Use postpaid card. Circle No. 113

WING NUTS

Stamped and press wing nuts are dimensionally drawn and specified in an eight-page catalog. Various types are available in steel and brass. Central Screw Co., 3501 Shields Ave., Chicago 9, Illinois.

Use postpaid card. Circle No. 114



ASSEMBLY LINE SEATING

Metal chairs and stools for production seating at work are pictured and cataloged in a four-page brochure. Chairs and stools are grouped in adjustable, quick adjustable and fixed height categories and charted against eight types of optional equipment. The Toledo Metal Furniture Co., 1100 Hastings St., Toledo 7, Ohio.

Use postpaid card. Circle No. 115

WORK HOLDERS

Work holders and clamps for welding, soldering, brazing and bonding operations are pictured and described in a two-page flyer. Specifications are given

**REDUCE FATIGUE!
INCREASE PRODUCTIVITY**

NEW!
Bridgeport
CUSHION
GRIP
NUT DRIVER

Blisterproof
Oil & water
resistant
Neoprene
Grip
permanently
locked into
tough amber
handles

Now, for the first time, you can obtain Nut Drivers with all the proven advantages of the famous Bridgeport Neoprene CUSHION GRIP!

- ★ **SUPER COMFORTABLE** (resilient neoprene never hurts the hand!)
- ★ **TREMENDOUS TURNING POWER** (Tests prove the CUSHION GRIP allows you to turn nuts tighter than ordinary nut drivers!)
- ★ **NON-SLIP GRIP** Even when wet or oily your hand won't slip!
- ★ **UNBREAKABLE HANDLE** (Hammerproof shockproof, non-flammable! Durable nickel plated hot forged steel blades.)
- ★ **FULLY GUARANTEED**

9 sizes in open stock:
3/16", 7/32", 1/4",
5/16", 11/32", 3/8",
7/16", 1 1/2", 9/16".
\$1.00 to \$1.50 list.

Available
through
jobbers or
write
manufacturer:

THE BRIDGEPORT HARDWARE MANUFACTURING CORPORATION BRIDGEPORT, CONNECTICUT U.S.A.

Use postpaid card. Circle No. 264

NEW CATALOG



**SEND
FOR YOUR
FREE
COPY
TODAY**

SEE US AT
DESIGN
ENGINEERING
SHOW
•
BOOTH 1109

- **SAVE** lengthy calculations
- **SAVE** drafting time
- **SAVE** delivery time

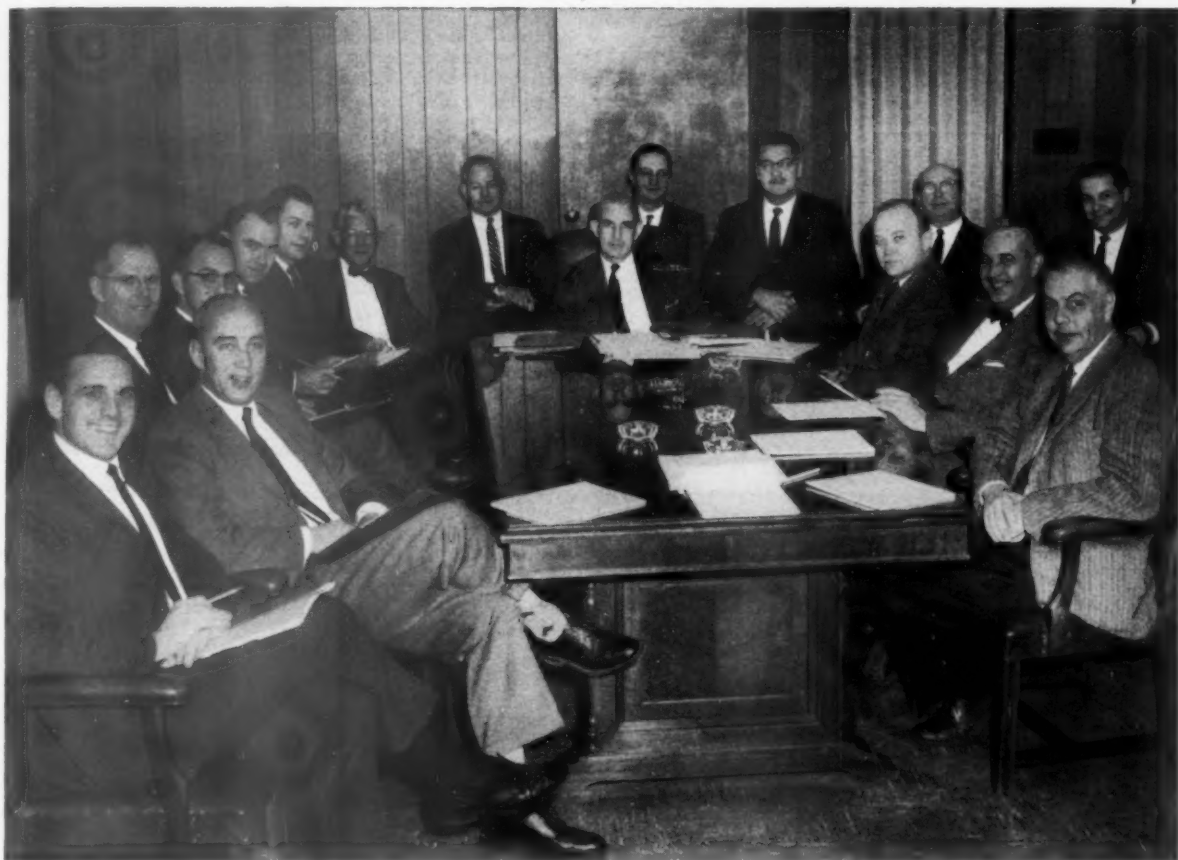
LEE SPRING COMPANY

DIVISION OF LEETRONICS, INC.

30 Main Street, Brooklyn 1, N. Y. • ULster 5-7163

Use postpaid card. Circle No. 265

Assembly and Fastener Engineering



Members of the Phillips Recess Engineering Standards Committee, shown left to right, are: R. Mark DiFruscio, Screw Research Assoc.; Ken Ringland, Central Screw Co.; Harry Johns, Steel Company of Canada, Ltd.; Ed Tauscher, Pheoli Manufacturing Co.; Alan Barclay, Steel Company of Canada, Ltd.; Marshall Hammond, Wrentham Steel Products Co.; Fred E. Youngdahl, Wrentham Steel Products Co.; Frank J. Washabaugh, American Screw Company; Herman G. Muenchinger, Chairman — American Screw Co.; Cyril Smith, Linread, Canada, Ltd.; Louis Cummaro, Screw Research Association; John J. Simko, National Screw Mfg. Co.; Harvey Erdmann, National Screw Mfg. Co.; Art Breed, Lamson & Sessions Co.; Vincent Mottola, Screw Research Assoc.; Ed Locke, Continental Screw Co.

Phillips Screw Makers Launch **"OPERATION CLOSER CONTROL"**

Better quality control methods . . . improved product quality . . . assurance of *uniform* quality for customers. Those are the goals set by the men pictured above. Representing many of the leading licensed manufacturers of Phillips Screws and Drivers, they are members of the Phillips Recess Engineering Standards Committee, a function of the Screw Research Association.

This committee recently discussed and evaluated present Phillips manufacturing standards and elected a sub-group to establish new, closer standards. Improved quality control is sought for such factors as recess and head concentricity, fractured heads, bit life and recess penetration depth.

It's a job that will call for teamwork by engineering and manufactur-

ing personnel alike. These men know that their product has made possible faster, better, more economical techniques in mass production everywhere. They want to *keep* it "the fastener with a plus."

Upon completion of the new standards, a new Consumer Technical Manual will be made available describing them in detail.

for the adjustable, the 90°, the straight clamping faces. Wales Strippit Inc., Akron, N.Y.

Use postpaid card. Circle No. 116

CLAMPS, JIGS

Clamps, jigs and fixture components are dimensionally drawn and specified in 72-page Catalog 20. Lodding Inc., 16921 W. 8 Mile Rd., Detroit 35, Mich.

Use postpaid card. Circle No. 117

SOLDER

Solders available in acid core, rosin core, solid wire, bar or sheet are covered in a one-page flyer. A chart shows in degrees F and C and melting point for available solders. Anchor Metal Co., Inc., 966 Meeker Ave., Brooklyn 22, N.Y.

Use postpaid card. Circle No. 118

TERMINAL ATTACHING

Automatic wire-measuring, cutting, stripping and terminal attaching is done on a machine introduced in a four-page bulletin. Capacities of the TA-20-S are listed and features are indexed on a photo. Artos Engineering Co., 2757 S. 28th St., Milwaukee 46, Wis.

Use postpaid card. Circle No. 119

TAPPING ATTACHMENTS

Two complete lines of tapping attachments for machines with reversing and non-reversing spindles are pictured and specified in a four-page brochure. Capacities range from No. 00 to 1". Design features and in-operation photos are included. Tapmatic Corp., 845 W. 16th St., Costa Mesa, Calif.

Use postpaid card. Circle No. 120

TROLLEY CABLE CONVEYOR

New engineering features in overhead cable conveying are presented in four-page Bulletin C-60. Idler wheel turns, rapid dip vertical idler turns, vertical S-curves, horizontal track curves are illustrated and discussed. Harry J. Ferguson Co., 115 West Ave., Jenkintown, Pa.

Use postpaid card. Circle No. 121



CLIP MOUNTED BUMPERS

Self-retaining rubber extrusions are fastened by a spring steel clip with dart base design. Six features of the assembly are listed in a four-page bulletin which pictures and describes the six types of bumpers, mounts, feet and spacers available. Cooper Tire & Rubber Co., Findlay, Ohio.

Use postpaid card. Circle No. 122

NYLON ANCHORS

Two-piece nylon body and steel pin anchor fasteners are introduced in a pocket-sized bulletin. Typical uses of the hammer-driven Tap-Its are pictured and features listed. Robert Q. Partridge, Inc., 2222 N.W. 10th Ave., Miami 41, Fla.

Use postpaid card. Circle No. 123

BROACHES

Standard round, square, hex and serration portable push-type broaches are cataloged in a four-page brochure. The 55 standard Sir Presquick broaches are specified for use with small arbor presses and similar equipment. California Broach Co., 666 S. Anderson St., Los Angeles, Calif.

Use postpaid card. Circle No. 124



DEBURRING TOOLS

Cutting, burring, and hole chamfering time through automatic tools is the theme of Bulletin 1115. How Nobur is chucked on lathes, drill presses and other machines is shown in photo sequence. Features are described in text and charts. Specifications given. Nobur Mfg. Co., 6860 Farndale Ave., North Hollywood, Calif.

Use postpaid card. Circle No. 125

COLD HEAD

MINIATURE PARTS with MORRIS-OMEGA

The new Morris-Omega "00" SDDS Cold Header forms parts from wire down to .012" diameter in lengths as short as .016" — and at production rates as high as 150 per minute!

The Model "00" is only one of a series of precision heading machines, which includes a special open die type that will head parts up to 2 3/4" in length on wire sizes from .020" to .090".



For complete details and prices, write:

REM SALES INCORPORATED

SUBSIDIARY OF THE ROBERT E. MORRIS COMPANY

5010 FARMINGTON AVENUE • WEST HARTFORD 7, CONN.

Use postpaid card. Circle No. 267

PLASTIC PARTS

Close tolerance parts are machined and extruded of Teflon and other plastics. A six-page house organ pictures plant facilities in operation, shows typical parts and lists tolerance ranges and stocked products. Tri-Point Plastics, Inc., 175 I. U. Willets Rd., Albertson, N.Y.

Use postpaid card. Circle No. 126

WELD FASTENER ELECTRODE

A specially-designed electrode for welding pilotless nuts, spacers and thru-hole screws and pins is introduced in attractive Bulletin 604. Features are pointed out in text and drawings. A chart helps choose proper electrode diameter for various weld parts. User testimonials are included. The Ohio Nut & Bolt Co., 33 First Ave., Berea, Ohio.

Use postpaid card. Circle No. 127



FUSION WELDING ALUMINUM

A technical handbook covers fusion welding of aluminum by gas, metal arc, TIG, straight polarity, MIG welding methods. Included in the 32-page guide are sections on TIG and MIG welded joint design. Reynolds Metals Co., Richmond 18, Va.

Use postpaid card. Circle No. 128

ASSEMBLY LUBRICANT

How a grease consistency lubricant reduces galling, seizing and metal pick-up in assembly and fastening applications is told in four-page Bulletin 126B. Instructions for applying the lubricant are given. Sample. The Alpha-Molykote Corp., 65 Harvard Ave., Stamford, Conn.

Use postpaid card. Circle No. 129

POWER ASSEMBLY TOOLS

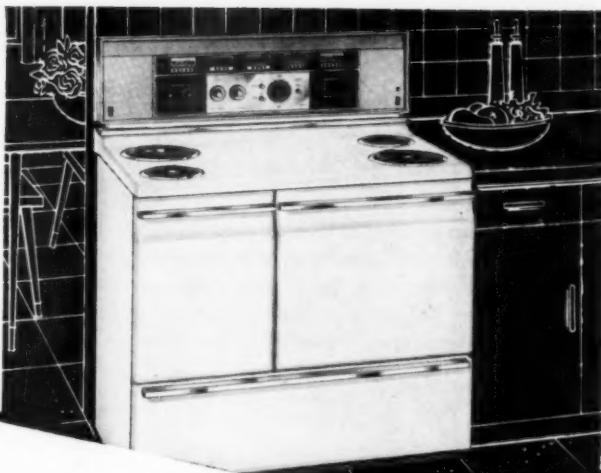
Automatic drilling, tapping and fastening is the theme of an eight-page brochure on a line of power pneumatic tools. Engineering data on capacities, methods of selection, accessories and specifications is in the form of tables, text and photos. Buckeye Tools Corp., Box 966, Dayton 1, Ohio.

Use postpaid card. Circle No. 130

POWER SCREWDRIVER

Features of the new R-A-F (rapid automatic fastening) air screw driver are presented in Form 5266. Dimensions, power ranges, screw pattern capacities for the stationary unit which cycles every 1½ seconds are included. Ingersoll-Rand, 11 Broadway, New York 4, New York.

Use postpaid card. Circle No. 131



Hotpoint relies on...

FEDERAL-WARCO

Federal Multi-gun, combination spot and projection welders are a vital link in the exacting production schedules of Hotpoint ranges. The Federal unit shown below welds and forms range frames—adjusts to accommodate five cabinet sizes—maintains high Hotpoint volume without sacrificing quality standards.

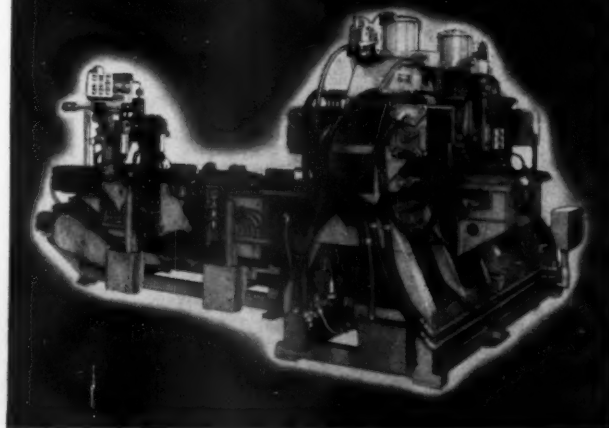
Leading metal fabricators throughout the country have learned they can rely on Federal resistance welders and Warco mechanical presses for dependable high speed performance. Precision engineered to your exact requirement by

THE FEDERAL MACHINE AND WELDER COMPANY

Warren, Ohio



Federal Multi-gun, Combination Spot and Projection Welder #58W3096A-B.



Use postpaid card. Circle No. 268

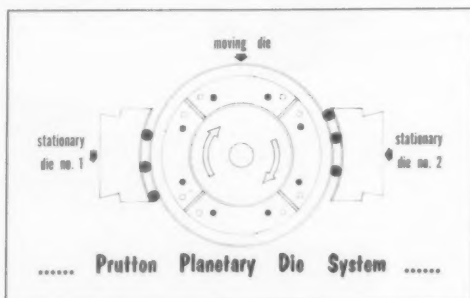
PRUTTON PLANETARY THREAD ROLLING

... produces up to **48,000** pieces per hour!

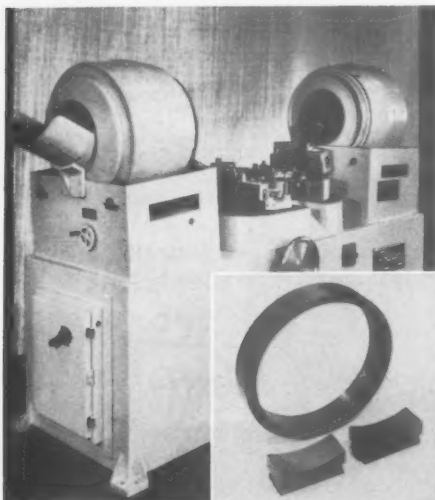
HERE'S HOW—

The Prutton Rollmaster takes advantage of a better application of thread rolling principles used in all production thread rolling. An important departure is in the rigidity of the thread rolling dies. Deflection or "spring" is eliminated. Note that a 300 pound forging spindle is supported by two Timken tapered bearings rated at 8 times maximum load.

A set of Prutton RTH Thin-wall Ring Dies consists of a one-piece rotary die and two stationary die shoes. The single round moving die serves both stationary dies simultaneously. Prutton's Exclusive Taper-Lock Die Holder locks the round ring firmly in position with the same action as a chuck on a lathe. It is possible to true up the die to .001 T.I.R. in 10 minutes.



ELIMINATE "Lost Motion" ON YOUR WORK . . .



Prutton Planetary Thread Rolling Machine
Model 125A-24

The Prutton Planetary Die Principle can be used with equal effectiveness for thread rolling, knurling, marking, serrating and necking of bolts, screws, nails and special parts in a wide range of sizes.

On a conventional machine only a single blank is rolled with each forward stroke of the moving die. The return stroke accomplishes nothing except to return the empty die to its starting position.

Compared to the old method of making only a single part at a time, a Prutton machine can produce as many as eight threaded parts per cycle. The rotary die is mounted on a main spindle of the machine and the stationary dies are diametrically opposed across the center of the moving die. A cycle is completed each time the moving die completes a 360 degree rotation. There is no lost motion. The number of threaded parts engaged by the die at one time is limited only by the number of starts on the dies. That is how speeds of 600 to 800 pieces per minute are possible with a Prutton Planetary Thread Rolling Machine. These remarkably efficient machines can cut cost as much as 65%. One Prutton can turn out as much work as 4 conventional machines.

Write or Phone for Cost Saving Information TODAY!

Prutton

CORPORATION
5295 WEST 130TH STREET
CLEVELAND 30, OHIO

Leader in Planetary
Thread Rolling

JUST PIN THIS COUPON TO YOUR LETTERHEAD

PRUTTON CORPORATION
5295 W. 130th Street
Cleveland 30, Ohio
Dept. AF

Please send information on
Model 125A-24 Thread Rolling
Machine.

Name Title

Company

Street Address

City Zone State

Use postpaid card. Circle No. 269

PROTECTIVE HAND LOTION

Protection against industrial skin rashes for assembly line workers is offered through an antiseptic lotion. Sample users and their testimonials are included in this two-page flyer. Vanfaire Co., 10732 Riverside Dr., North Hollywood, California.

Use postpaid card. Circle No. 132

SILICONE RUBBER PARTS

Custom engineered seals, extruded and molded parts and sheet and die cuts are described in a four-page bulletin. A chart of special purpose compounds lists temperature and durometer ranges and applications. Typical parts are pictured. Taunton Division, Havig Industries, Inc., 336 Weir St., Taunton, Mass.

Use postpaid card. Circle No. 133



ROLLER CHAINS, SPROCKETS

Stock sizes of roller chains and sprockets are listed in 44-page catalog 2757, "Keydexed" for quick reference, the book lists over 2000 types and sizes of pitch power transmission chains, conveyor chains, roller chains and many types of sprockets. Link-Belt Co., Prudential Plaza, Chicago 1, Ill.

Use postpaid card. Circle No. 134

AIRCRAFT BOLTS

Aircraft bolts providing 220,000 psi tensile strength and weighing no more than regular NAS 624 series bolts are featured in Bulletin 2531, LWB 22 configuration is shown in photos and design drawings. Tension and fatigue test results are graphed. Standard Pressed Steel Co., Box 1121, Jenkintown, Pa.

Use postpaid card. Circle No. 135



CORROSION RESISTANCE

Corrosion resistant fastenings are net priced in an 88-page catalog. Bolts, nuts, screws, washers and rivets in eight metals are specified and priced in easy-to-locate format. H. M. Harper Co., 8200 Lehigh Ave., Morton Grove, Illinois.

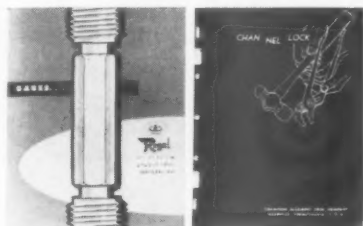
Use postpaid card. Circle No. 136

Assembly and Fastener Engineering

RING, PLUG GAGES

Ring and plug gages are priced and specified in a 24-page catalog. Charts include tap recommendations for classes of threads. Industry screw standards are also listed. Beloit Tool Corp., Beloit, Wis.

Use postpaid card. Circle No. 137



38 PLIERS

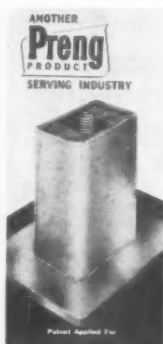
Channellock pliers for assembly and maintenance are pictured, priced and specified in 16-page Catalog 556. Assortments are grouped for automotive, electrical and general use. Champion DeArment Tool Co., Meadville, Pa.

Use postpaid card. Circle No. 138

ANCHOR BOLT AND WELL

A flexible, retractable Preng anchor bolt and well for mounting equipment is described in gatefolded mailing piece. A blueprint-type drawing is accompanied by an outline of the four-step installation procedure. Paton-Reynolds Co., 2150 N. Ritter Ave., Indianapolis 18, Indiana.

Use postpaid card. Circle No. 139



HEADED PINS

Tool steel headed pins are sized and quantity priced for standard 2" lengths and extra long lengths. A four-page, pocket-sized flyer gives other features. Durant Tool Co., 1-15 Thurburs Ave., Providence 5, R.I.

Use postpaid card. Circle No. 140

ADHESIVE DESIGN

Information on designing joints for bonding with structural adhesives is contained in an illustrated 16-page manual. Types of adhesives available, their properties and uses, equipment, are also discussed. Letterhead request, Adhesives, Coatings and Sealers Div., Dept. AFE, Minnesota Mining and Mfg. Co., 900 Bush Ave., St. Paul 6, Minn.



HOW IT WORKS:

1. Slip wrench on nut in any position. Turn either way.



2. WRENCHING pawl immediately locks against nut in this position.

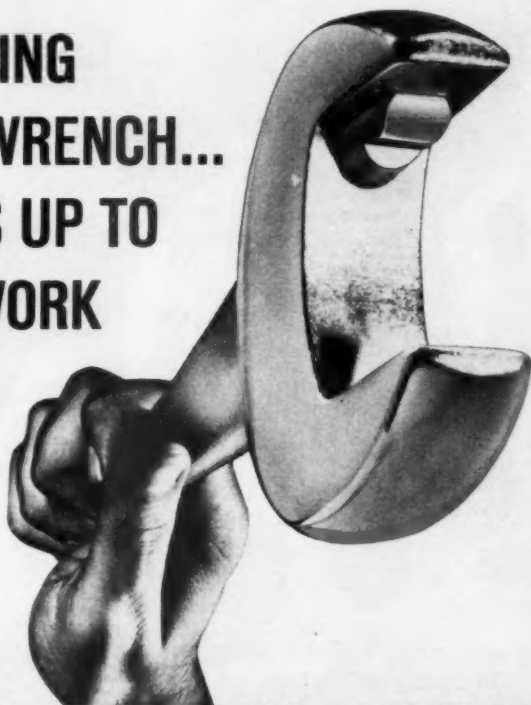


3. After turning the nut, WRENCHING releases and ratchets like this.



4. WRENCHING locks again for next turn. To loosen nut, simply turn wrench over.

AMAZING NEW WRENCH... SAVES UP TO 70% WORK TIME!



Manufactured by Royal Tools, Inc.

Marketed Industrially by The Bristol Company

You'll have to see this to believe it!

Here's a new end-wrench that grips and turns nuts so rounded that ordinary wrenches can't move them. Yet it gives you true, fast ratchet action that can save you up to 70% in work time.

It's WRENCHING†, first really basic end-wrench improvement in years. Three-way gripping action clamps firmly on nuts at three points (as against two for ordinary end wrenches) and allows you to turn corner-rounded nuts that you'd ordinarily throw out or, if already installed, have to cut off. WRENCHING'S extremely simple, completely reliable ratchet action speeds assembly and increases production on almost every job using nuts; yet the new wrench requires no more clearance than an ordinary end-wrench.

See WRENCHING today at your Bristol Socket Screw Distributor's. You won't rest till you get a set. All popular end-wrench sizes. Or write: The Bristol Company, Socket Screw Division, 185 Bristol Road, Waterbury, Conn.

A.O.S

†Patents Pending

Precision socket screw manufacturers since 1913

Bristol's Hex Socket Screws

Bristol's Multiple-Spline Socket Screws

*Made in sizes as small as No. 0 in Alloy Steel and Stainless Steel. Cap screws up to 1½" diameter.

THE BRISTOL COMPANY

Socket Screw Division
Waterbury 20, Conn.

See us in booth 430 at Design Engineering Show.

Use postpaid card. Circle No. 270

PARTS FEEDING BY AUTOMATION

...feeds dollars into
your profit column



In costing today's high speed production it makes sense if you increase production without adding direct labor, the dollars show up in profit... fast!

Since AD equipment is self liquidating with labor savings it also adds dollars in earnings all along the line.

Let any one of AUTOMATION DEVICES' sales engineers, located throughout the country, help you streamline your production facilities and you'll add dollars to your profit.

Send for informative literature and the name of nearest AD representative.



PISCO & VFC DIVISIONS
... TWO GREAT NAMES IN PARTS FEEDING

AUTOMATION DEVICES INC.
ERIE, PENNSYLVANIA

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 CONDUIT LOCKNUTS — Up to 6"	 SPRING-NUTS	 FINISHED NUTS
 VOLUME-CONTROL & SWITCH MOUNTING NUTS	 STOP-NUTS	 WING NUTS
 MACHINE-SCREW NUTS	 CAP NUTS	 LOCKNUTS

Available in Stainless Steel, Silicon Bronze, Brass, Aluminum and Steel

JACOBSON NUT MFG. CORP. Kenilworth, New Jersey

Use postpaid card. Circle No. 272

Congress of Motor Hotels TRAVEL GUIDE

by **BILL ROAMER**

—DENVER, COLO.



Here in Denver, I've been staying at the LA VISTA MOTEL, and I recommend it highly. It's convenient to downtown, close to the airport. The units are new, modern and sound-proofed — air-conditioned and individually heated. Phones and TV in each room. Free morning coffee. Meeting rooms available. Credit cards honored.

LA VISTA MOTEL
5500 E. Colfax
at Hudson
DENVER, COLO.



FREE! Write to this motel for your free copy of the 1960 edition of Congress TRAVEL GUIDE. Lists over 700 fine motels

**COAST-TO-COAST
INSPECTED and APPROVED**

INDUSTRY MAKES NEWS

FASTENER SHIPMENTS RISE IN FEBRUARY

Shipments of industrial fasteners increased in February to a 164 reading on the Industrial Fastener Index. The seasonally adjusted figure was tops since last July's 165 and compared to 149 in January and 146 for the year 1959.

February in the previous four years stood at 153, 117, 177 (1957) and 169. The base of 100 is an average of the years 1947-49.

WELD, ASSEMBLE GIANT SATURN ROCKET

A massive rocket engine to power manned earth-orbit flights or electronic exploration of the moon and distant space is being welded together and assembled at Redstone Arsenal in Huntsville, Alabama.

Rated at 1.5 million pounds of thrust, the project Saturn engine will generate more than four times as much thrust as present intercontinental ballistic missiles. The Army will accomplish this by clustering eight highly-reliable H-1 liquid propulsion units and linking them to fire simultaneously.

A large share of the hundreds of tons of liquid oxygen required for Saturn's giant booster will be carried in a Jupiter missile, sheathed in highly-weldable 5456 Alcoa aluminum. Eight modified Redstone missile tanks, containing liquid oxygen and fuel, will encircle the Jupiter. Each of the engines grouped below the tankage will pump its own fuel.

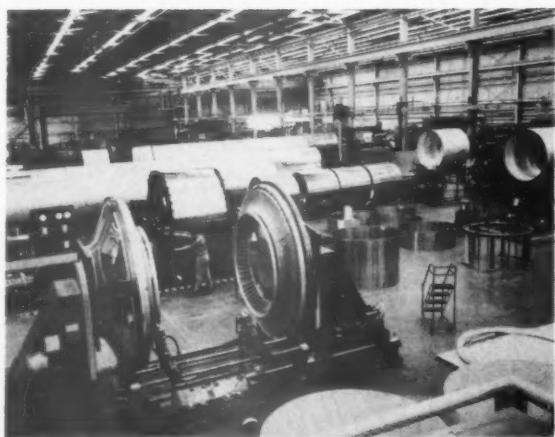
Saturn can place a 15-ton manned satellite in earth orbit, send a one-ton payload to the moon or electronic exploration vehicles to Venus and Mars.

DESIGN ENGINEERING SHOW TO DRAW 20,000

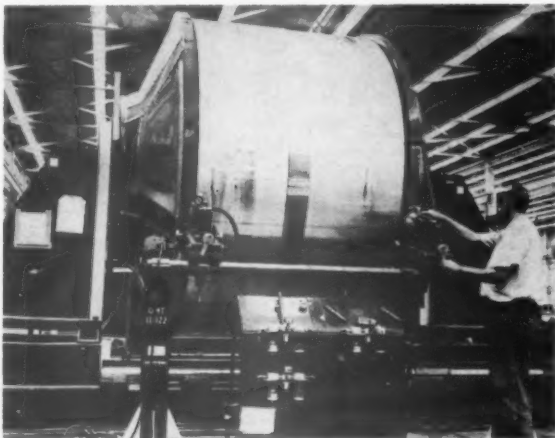
American manufacturers will get a glimpse of the products of the future when the Design Engineering Show, largest exposition devoted to research and development, unveils a \$10,000,000 exhibit on May 23. The show will run for four days at the Coliseum in New York City.

Twenty thousand engineers and company executives, whose responsibility it is to design the products of tomorrow, are expected to attend. Virtually every major manufacturing company in the country will be represented among the visitors. Some companies

continued



Eight 70-inch tanks for the Saturn super-booster are shown in various stages of fabrication and assembly at Redstone Arsenal's engineering laboratory. The tanks will carry fuel and liquid oxygen.



Aluminum sheet, placed in a fixture, is joined by circumferential welding. The segment will be part of a 60-foot long tank holding missile fuel.

send teams of as many as 20 to inspect the varied products. About 15,000 products, which go into the making of end products will be shown.

Everything that goes into the ultimate product used in the home or factory will be on display. Mechanical components will be shown by 105 companies, electrical and electronic components by 94, power transmission equipment by 65, metallic materials by 61, non-metallic materials by 55, shapes and forms by 53, fasteners and adhesives by 49, finishes and coatings by 23, and 62 companies will have exhibits to show engineering equipment and services.

Concurrently with the show, and also at the Coliseum, the machine design division of the American Society of Mechanical Engineers will conduct a four-day conference. This year's papers will concern themselves with the application of space-age design theory and techniques to new customer products. Advances made in power, control, materials, computers, components and mechanics will be considered.

The opening session, "New Horizons in Engineering Design," will feature design authorities from both the field of space technology and nuclear science.

Among the new designs developed especially for visitors to this show is a small plastic plate, similar to those used for credit cards, which eliminates the necessity for a visitor to write his name each time he requests information or a salesman's visit.

Advance rapid registration cards, conference and hotel information are available by writing Clapp & Poliak, Inc., 341 Madison Ave., New York 17, N.Y.

CP STAGES TORQUE CLINIC AT ASTE SHOW

Chicago Pneumatic Tool Co., New York, staged a colorful torque control clinic at the 1960 ASTE Show. Sixteen models of torque-limiting screwdrivers and nutrunners were displayed. A new calibrator capable of readings up to 200 in.-lbs. was introduced.



FASTENER SEMINAR held by Parker-Kalon for one of its distributors was directed by Walter Toepel, manager of the P-K sales engineering department (fourth from left in photo). Thirty-five employees of the Chas. A. Strelinger Company in Detroit attended the three-day technical sessions on sales and service of industrial fasteners.

MAJOR ELECTRIC APPLIANCES UP IN 1960

Sales of electric ranges, dishwashers and home freezers increased in February over the same 1959 period, reported the National Electrical Manufacturers Association. Slight drops were recorded in household refrigerators, water heaters and food disposal units. Over the first two-month period, sales are up in all categories except freezers and water heaters.

In the two major categories, refrigerators sold at a 569,100 pace compared with 562,400 last year and 256,700 ranges were marketed compared to 255,400 in the first two months of 1959.

Speed Tying Operations!



- ★ Cheaper than String
- ★ Faster than Tying
- ★ Sure Grip
- ★ Colorful

H.F. Hanscom & Co., Inc.
5 Virginia Avenue
Providence 5, R. I., U.S.A.

Top view of Hanscom-Tie is shown. Bottom is flat.

NO KNOTS TO TIE!

Cut your tying time in half! Hanscom-Ties are the fast, sure way to bundle wires, cords, coils, etc. Nothing to tie. Just wrap 'em around and twist. For temporary or semi-permanent holding. Available in cut lengths 1" to 24" and on spools — bright colors or printed. Prices from 26¢ per thousand. WRITE FOR SAMPLES and TRY 'EM YOURSELF.



Use postpaid card. Circle No. 273

FOR TIMESAVING ASSEMBLY OF SMALL PARTS . . .

DIXON Auto-Positioner

IN FOUR STANDARD MODELS

- New Positive-Acting Feeder
- Automatic Sensing Device
- Easy to Install — Simple to Operate

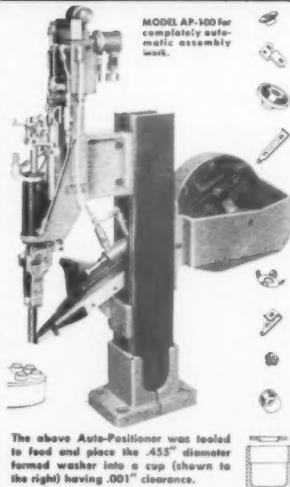
The Dixon Auto-Positioner is a compact, air-operated automatic assembly machine for parts from 1/16" to 2" size at speeds up to 6000 cycles per hour. It is furnished as a fully automatic station for use at a dial or in-line transfer table, or as a self-contained machine with pedestal and fixture table. There are four models, providing a selection of equipment to suit your requirements.

Dependable, Accurate, Compact

The new parts feeder is simple, compact (only 6 inches wide), and efficient. It provides positive advancement of the part into the chuck; it has a straight track and a positive-acting escapement; and it requires no separate motor or vibrator. Automatic sensing assures quality control. It interrupts the cycle when a part is missing or improperly assembled.

Standard Equipment, Easily Retooled

The chuck, positioning punch, and feeder tooling are easily modified or replaced for other jobs. Compactness permits close nesting at multiple stations, cutting cost of fixtures, dials, or transfer devices.



The above Auto-Positioner was tooled to feed and place the .455" diameter turned washer into a cup (shown to the right) having .001" clearance.

Send for Bulletin AP-B2 or request our machine planning service.

DIXON DIXON AUTOMATIC TOOL, INC.
2309-23rd AVENUE • ROCKFORD, ILLINOIS
EQUIPMENT FOR AUTOMATIC PARTS HANDLING AND ASSEMBLY

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Assembly and Fastener Engineering

POWER TOOL FIRMS DISCUSS MERGER

Exploratory merger talks are under way between Ingersoll-Rand Co., New York City, and Black & Decker Mfg. Co., Towson, Md., reports Robert H. Johnson, Ingersoll-Rand chairman. Spokesmen report that the subject was first broached late in 1955 and the discussion resumed several months ago.

Ingersoll-Rand currently holds something under 10% of the outstanding Black & Decker common stock. Ingersoll-Rand sales last year were \$161,515,939 and Black & Decker's were \$52,771,220.

KOPF MANAGES NELSON STUD DRIVER DIV.

Rowland Kopf, manager of Gregory Industries, Inc.'s newly established Nelson Stud Driver Division, has been actively identified with the development of powder actuated tools since the early '40's. A total of 45 patents relating to powder actuated tools and drivestuds have been issued in his name.

Kopf served with Iron Fireman Mfg. Co. from 1937 to 1945, when that company was developing the first American stud driver. He was with Ramset for 12 years. In 1958 he established his own design and marketing business in the diamond core drilling field.



ROBOTRON EXPANDS INTO DIVISIONAL SETUP

Robotron Corp., Detroit, has adopted a new product grouping policy, announces president Charles Schamanek. Expansion has led the company to split into four divisions now referred to as: Resistance Welding, Automation Devices, Regulators, and Induction Heating. Each division will function within the corporation under production, sales and shipping policies peculiar to its market areas and product applications.

HUNTER SPRING ADDS DESIGN ENGINEER



Raymond J. Neely has been appointed design engineer by the Hunter Spring Company, a Division of American Machine & Metals, Inc., Lansdale, Pa. Neely will be concerned with the design and development of special inspection testing and manufacturing equipment. He was formerly with the Tinius Olsen Testing Machine Company for eight years as a design engineer.

CLEVELAND PNEUMATIC COMBINES DIVISIONS

Cleveland Pneumatic Industries, Inc., Cleveland, Ohio, has announced that its Industrial Sales Division, Skokie, Ill. has been consolidated with Renco-Aire Division, Kalamazoo, Mich., to form the Industrial Productions Division, also in Kalamazoo. Howard W. Ronfeldt is general manager, and acting sales manager; Harry A. Heath, operations manager and acting director of engineering, and Thomas Prior, manager of accounting.

HUCK NAMES EASTERN AIRCRAFT ENGR. REP.

Fred J. Coelen has been named engineering representative for the New England states for Huck Manufacturing Company, Detroit.

Coelen joined Huck in 1959 and has been engineering representative covering the lower three-fourths of the state of Texas. His transfer to the East Coast as aircraft specialist is part of a recently announced reorganization designed to align sales engineering efforts along industry market lines. He will work under the direction of F. F. DeLoach, aircraft Division manager.

Coelen brings to his new job a background of 14 years in engineering design and management



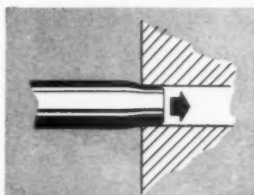
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SPIROL - the spring PIN with PERFECT CHAMFER



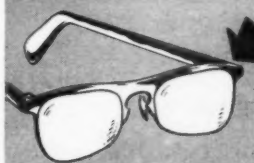
A. Smoothly rounded radius where chamfer meets shank eases insertion into hole. No sharp break to "bite" and resist insertion. B. Chamfer angle is precisely designed to offer minimum thrust resistance and maximum compression leverage.

OTHER UNIQUE SPIROL FEATURES



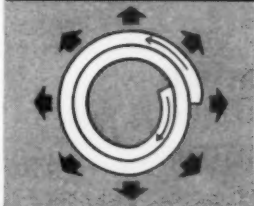
WIDER HOLE TOLERANCES

Both plus and minus hole tolerances are allowed because spiral construction permits greater flexibility in expansion and compression. The wider hole tolerances eliminate precision reaming requirements, reduce drilling rejects, cut costs.



MINIATURE PINS

SPIROL is the only spring type pin available in these miniature diameters: $\frac{1}{32}$ " - .039" - $\frac{3}{64}$ " - .052". Unique spiral cross-section retains flexibility and strength in smallest sizes. Other standard sizes up to $\frac{1}{2}$ " diameter.



SHOCK RESISTANCE

High resistance to shock and vibration permits use of "medium duty" SPIROL pins in a wide variety of materials with wide range of bearing loads. Heavy and light duty SPIROL pins also available in stock.

NON-HEAT-TREATED METALS can be specified in standard SPIROL pins for extra corrosion-resistance or conductivity. Less resilient metals are usable because stress is evenly distributed throughout the spiral cross-section, giving maximum spring action.

FREE! Write for literature on Spirol Pins.



SPIROL PIN

C. E. M. COMPANY, INC. • 38 SCHOOL STREET • DANIELSON, CONN.

Use postpaid card. Circle No. 275

positions. Prior to joining Huck, he had been senior standards engineer with Chance Vought Aircraft Company in Dallas.

RB&L NAMES SALES MGR. FOR SPECIALS



James M. Dill has been appointed to the newly-created position of special products sales manager for Russell, Burdsall & Ward Bolt and Nut Co., Port Chester, N.Y. He will be concerned with such products as stainless steel, aluminum, brass, silicon bronze, Delrin and Nylon, as well as proprietary fasteners. Dill joined the company in 1946.

RHODES JOINS OSTROM COMPANY

E. E. (Dusty) Rhodes, for the past eight years service engineer for National Electric Welding Machines Co., Bay City, Mich., has joined the staff of the K. Wm. Ostrom Co., Inc., Drexel Hill, Pa., as a sales engineer.

Ostrom is exclusive sales representative for National Electric in New Jersey, Maryland, Delaware, Virginia, eastern Pennsylvania and Washington, D.C. Rhodes will specialize in container manufacturers' problems.

ILLINOIS TOOL PROMOTES BEART TO V-P

Robert W. Beart has been elected vice president of patents and developments. He will supervise products and equipment research development programs within the Company's divisions and subsidiaries, including Shakeproof, Fastex and Calinoy. Beart has been director of the patent department since 1948.



STANLEY-HUMASON ELECTS TWO VICE-PRES.

At the annual meeting of Stanley-Humason, Inc. subsidiary of The Stanley Works, Forestville, Conn., Frederick R. Downs, Jr., formerly sales manager, was elected vice president, sales, and Peter D. Prudden, plant manager, was elected vice president, manufacturing.

Downs has been sales manager since 1953, following his appointment as assistant sales manager in 1951. He joined Stanley-Humason as an estimator in the purchasing department in 1940. He is a director of The Spring Manufacturers Association Inc. and is presently president of the New England Group of Spring Manufacturers.

Prudden joined Stanley-Humason, Inc. in 1946 as a junior engineer and became a plant engineer in 1948. He was appointed plant superintendent in 1957 and plant manager two years later.

KRAUS JOINS ALLEN SALES FORCE

John Kraus has been named field sales representative in southern Ohio for The Allen Mfg. Co., of Hartford, Conn., announced Willis D. Horner, vice-president-sales. Kraus' territory will include Cincinnati, Dayton, Columbus and Springfield, Ohio with headquarters in Cincinnati.



Prior to joining Allen, Kraus was a salesman for the Buffalo Die Supply Corp., and earlier was associated with the Die Supply Company division of E. W. Bliss Company

LONG-LOK FORMS EASTERN SUBSIDIARY

Long-Lok Corporation, Santa Monica, Calif., announces the opening of general offices and plant at 68 Urban Avenue, Westbury, Long Island, New York, to be known as Long-Lok Eastern Corporation. President of the new company is Leonard A. Tria.

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brings you the
latest facts about
fastening with rivets . . .
tells you how and why
riveting speeds assembly
at lower cost.

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Please rush your new handbook,
"COST-CUTTING FACTS ABOUT FASTENING WITH RIVETS."

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Company _____

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For Stud Setting and Pulling and TORQUE CONTROL TOOLS

"Titantorker" Controlled Torque Driver



For variety of torque uses. Audible signal when desired torque is reached. Easy adjustment. Four sizes: maximum torques from 75" lb. to 225" lb. Female adapters in driving head; male adapters on torque base.

Controlled (Torque) Drive Stud Driver



Predetermined amount of torque can be applied to stud during driving. Simply adjusted by two Allen screws in spring adjusting nut—downward. Increased torque; upward. decreased torque. For use with any air or electric drill or drill press. Sizes #101—#102—#103.

"Bull Dog" Stud Driver Designed for Use With Impact Wrenches



Built for rugged use on heavy engines. Equipped with Titan Design, Loose Pressure Plunger. Definitely stands up under vibration encountered when using an impact wrench for motive power.

Titan "Roll Grip" Combination Stud Driver and Puller



Incorporates roll action to grip as little as 1/4 in. of unthreaded body of stud. Made in standard sizes from 3/16 to 3 in. inclusive.



World's Largest Producers Of
Stud Drivers And Pullers

TITAN TOOL CO.

47 MAIN ST., FAIRVIEW (ERIE COUNTY), PA.

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Assembly and Fastener Engineering

NEW COMPANY TO PRODUCE SPECIAL ALLOYS



Directing Metronics, Inc. and holding a sample of their product are (left to right): P. K. Hynes, R. V. Gensheimer, M. J. Nelson, W. O. Touhey.

Metronics, Inc., Englewood, N.J. has been formed to mass produce tungsten and molybdenum rod, wire and electrodes, tantalum and columbium rod and wire, and a variety of special alloys. Top management of the new company includes Michael J. Nelson, president, and Patrick K. Hynes, vice-president, both from the Wah Chang Corp.; Robert V. Gensheimer, vice president, from the Callite Tungsten Corp.; and William O. Touhey, secretary-treasurer, from the Electrometallurgical Division of Union Carbide Corp.

GOODRICH NAMES PROMOTION MANAGER

Mrs. Rubie C. Gross has been named manager of trade advertising and sales promotion for B. F. Goodrich Industrial Products Company, a division of The B. F. Goodrich Company, Akron, Ohio.

Mrs. Gross joined the company's advertising department in 1931. She became advertising manager of the aeronautical and international divisions of the company in 1941 and, in 1953, was named sales promotion manager of BFG's Industrial Products Company.

GILLEN ELECTED PARENT CO. DIRECTOR

James W. Gillen, president and general manager of the John Gillen Company, Cicero, Ill., subsidiary of Standard Railway Equipment Manufacturing Company, Chicago, has been elected a director of the parent company. Gillen has served in various posts in the business founded by his father in 1920, including those as general manager from 1939 and president from 1943.



FEDERAL NAMES NEW CHICAGO REP.

Neff, Kohlbusch & Bissell, Inc., Chicago, Ill. has been appointed sales and service representatives for The Federal Machine and Welder Company's line of mechanical presses. They cover Chicago and north central Illinois, northwest Indiana and Iowa.

GANTRY WELDERS SPEED MISSILE MAKING

Two specially designed gantry welders on 180-foot tracks are saving time and money in the high precision welding operations at the Reynolds Metals Company Missile Plant, Sheffield, Ala.

Designed and built by the plant staff, these virtually automatic units are proving valuable in meeting the ultra-high requirements for MIG (metal inert gas) girth welding of the modified U. S. Army aluminum "Redstone" shells to be used for preliminary space journeys by the "Mercury" astronauts.

continued

SPEED PRODUCTION and LOWER COST on your products

with this

GRIP-NUT

family of GRIPCO FASTENERS

All types and sizes of Gripco fasteners listed in catalogue are available for immediate delivery.

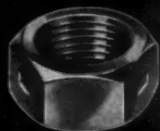
Qualified fastener engineers are available for consultation on all your assembly problems.

Other Gripco Products:

- BRASS GRIPCO OR CENTERLOCK NUTS.
- MINIATURE WELD AND CLINCH NUTS, WITH OR WITHOUT LOCK.
- GRIPCO AND CENTERLOCK HI NUTS.
- STANDARD SEMI-FINISH FULL AND JAM NUTS.
- STAINLESS STEEL LOCK, WELD AND SEMI-FINISH NUTS.
- COLD FORMED SPECIAL NUTS OR PARTS TO PRINT.



GRIPCO LOCK NUT
One piece all metal.



GRIPCO CENTERLOCK NUT
Locking feature in the center for fast feeding. Can be applied from either end.



GRIPCO CLINCH NUT
With or without Gripco Lock. For application to metal too thin to thread or for inaccessible assemblies. Hex collar prevents turning when torquing bolt.



GRIPCO PILOT-PROJECTION WELD NUT

With or without Gripco Lock. Centering collar positions nut and protects threads from weld spatter.



GRIPCO COUNTERSUNK WELD NUT

With or without Gripco Lock. Countersink protects threads from weld spatter.

The Nation's Oldest Manufacturer
of Lock Nuts

Send for samples and NEW CATALOG today

GRIP-NUT COMPANY

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All the basic welding equipment is mounted on each gantry which straddles the aluminum shells and can move along the common, but segmented 180-foot tracks.

The shells are rotated by a series of perfectly matched friction driving shells along the floor track. The rotation and all welding operations are controlled by each operator and his console on the individual gantry welders.

Before the installation of the first of these two gantry welders at the plant some 18 months ago, it was necessary to tie up the girth welding unit for hours during the tedious, painstaking work of aligning the two skins or shells as well as placing the heavy back-up bars.

Bolted construction was used in the framework, providing further flexibility. Extensions on the two upright columns and the crossbar unit can be adapted to larger diameter shells.

KNUDTSON MOVES UP TO V-P AT LEWIS BOLT



Donald W. Knudtson has been promoted to vice president of the Lewis Bolt and Nut Co., Minneapolis, Minn., announced Mark Paper, executive vice president.

Knudtson will handle all works management of the Minneapolis plant.

3M SETS UP NEW SALES ORGANIZATION

A new, nationwide sales and distributor organization to merchandise a complete line of adhesives, coatings and sealers for residential, commercial and industrial building applications has been announced by Minnesota Mining and Manufacturing Company.

"This new organization will facilitate procurement for architects, builders and contractors by making these products available from one source," said D. W. Maher, marketing manager for 3M's Adhesives, Coatings and Sealers division.

AMERICAN MOTORS BUILDS TORONTO PLANT

American Motors Corporation reports that its Canadian subsidiary will build an auto assembly plant in suburban Toronto this fall.

The 250,000 sq. ft. plant will employ 700. It will be built on a 40-acre site in the Peel Village development on the edge of Brampton.

Production of Ramblers will begin after the 1961 model introduction, and more than 10,000 units are expected to be assembled in the first year. American Motors sold about 8600 cars in Canada last year, all imported.

GRIES EXTENDS TEVES-BARRIER SALES AREA

A major expansion in the sales territory of Teves-Barrier, Inc., sales representatives in the South and Southwest, to include the state of Mississippi, has just been announced by Joseph Saks, director of sales, Gries Reproducer Corporation, New Rochelle, N.Y. Headed by Fred W. Teves and Blaine Barrier, the firm will also cover Texas, Oklahoma, Arkansas and Louisiana. The organization maintains offices in Dallas and Houston.

NEW FASTENER CONSULTING FIRM FORMED

Milton Johnson and Paul Lathom announce the formation of their new company, Fastener Engineers, Inc., at 1810 Broadway, Rockford, Illinois. The company has a fourfold purpose: to set up complete fastener plants or departments for clients; to design and advise on special machinery and application; to manufacture special equipment and dies to client's specification; and to conduct technical classes in all phases of fastener operations for client engineers and operators.



LATHOM



JOHNSON

**this machine will
drive up to
10 screws at
one time . . .**



... reducing assembly costs and improving quality. Built for high production jobs where a fixed set up is practical, this multiple spindle screw driving machine automatically feeds screws from a hopper and drives them to a predetermined torque. Evenly distributed pressure eliminates stresses caused by driving home one screw at a time. A simple sliding fixture positions work pieces accurately.

Machine illustrated shows application of multiple spindle screwdriving to assembly of electric power drills.

Send a sample of your assembly and a list of your requirements. We will be happy to show you how multiple spindle screw driving can be applied to your job.

COOK & CHICK COMPANY
2415 West 24th Street Chicago 8, Illinois

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SPECIAL RIVETS

like some of the samples shown here . . . or the more commonly used tubular and split rivets . . . they're all alike to the American Rivet Co. And always—our own special brand of quality and service that gets you what you want when you want it.

THE AMERICAN RIVET CO., Inc.
847 N. Kedzie Ave., Chicago 51, Ill.

Write for price list. For specials, send specifications for prices.

BUY AMERICAN Tubular and Split RIVETS

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Assembly and Fastener Engineering



O'DONNELL

HARRELL

FRANIG

NEARY

SALES, ENGINEERING CHANGES AT P-K

Parker-Kalon, a division of General American Transportation Corp., announces the appointment of a field sales manager and three field engineering representatives.

Gilbert Harrell, previously North Central states sales manager, has been named to the newly-created position of field sales manager. He has been with the firm since 1954. New field engineers and their territories are: Richard C. Franig, central Ohio, West Virginia; James Neary, Toledo-Cleveland-Youngstown; John E. O'Donnell, New England.

SALES APPOINTMENTS AT DENISON

John W. Lindsay has been appointed regional product sales manager for the new North Central region of Denison Engineering Div., American Brake Shoe Co., Columbus, Ohio. At the same time, James D. Schaffner was named field engineer for the St. Louis area, announced Denison Neale, director of sales. Both will handle the press lines.

Lindsay, who has been with the company since 1943, will direct engineering and application. Schaffner has been with Denison for 10 years and will cover the states of southern Illinois, Iowa, Missouri and Nebraska.

UNITED WELDERS ADDS DISTRIBUTOR

United Welders, Inc., Bay City, Mich. was appointed the George A. Marshall Machinery Co., Charlotte, N.C., representative for the states of Virginia, and North and South Carolina.

GREGORY JOINS POWDER TOOL INSTITUTE

The Powder Actuated Tool Manufacturers Institute has elected Leonard C. Barr, executive vice president of Gregory Industries, Inc., and Richard E. McGinnis, Gregory vice president for sales, to the Institute's Board of Directors on March 31 at a special meeting of the member companies in Cincinnati. Alvin G. Lane, executive director of PATMI, made the announcement.

Gregory Industries recently entered the powder actuated tool business with the establishment of its Nelson Stud Driver Division, in Lorain, Ohio.

LINREAD APPOINTS TWO NEW DIRECTORS

Recently appointed to the board of directors of Linread Canada Ltd., Guelph, Ontario, were Cyril C. Smith and G. A. Furlong. Smith came to the company in 1956 from the parent company in England and is now secretary and general manager of the plant in Guelph.



FURLONG



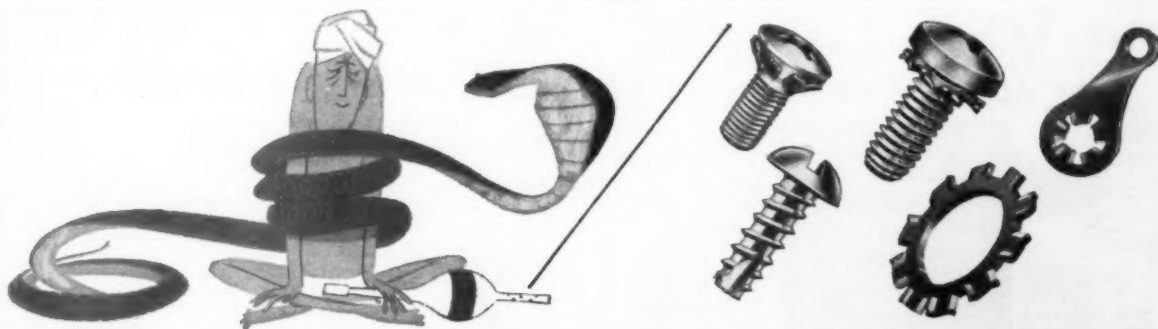
SMITH

AIR ASSOCIATES REPRESENTS TOWNSEND

Air Associates of Teterboro, N.J., has just concluded an agreement with Cherry Rivet Division, Townsend Company, Santa Ana, Calif., to join that organization as aircraft jobber for Cherry Rivet products throughout all 50 states. The announcement was made by John H. Roy, manager of aircraft sales, Cherry Rivet Division, and Charles A. Sereno, president of Air Associates.

Six regional offices of Air Associates will handle Cherry Rivets, products, tools and accessories in Teterboro, N.J.; Atlanta, Ga.; Chicago, Ill.; Wichita, Kan.; Dallas, Texas; and Glendale, Calif. The Air Associates regional organization maintains 56 offices in principal U.S. cities.

continued



Togetherness

matters with industrial fasteners, too!

Togetherness, industrial style, has a special meaning at Thompson-Bremer because we are one of the few fully integrated manufacturers of Sems, lock washers, thread-cutting screws, terminals and cold-headed specialties. With our engineering services and components manufacturing together under one roof, we can give you faster, more individualized service at competitive prices. We'll bid on your specials requirements, or fill orders for standard items on short notice from the extensive line of EVERLOCK products stocked by your local distributor.

If you buy or specify industrial fasteners, you want whatever your company assembles to go together economically and stay together reliably. Send for catalog and samples or call your EVERLOCK representative.



Thompson-Bremer & Co.
Division of
American Machine
& Foundry Company

Thompson-Bremer & Co., Dept. 22
228 N. LaSalle St., Chicago 1, Ill.

Please send me:

..... EVERLOCK fastener catalogs..... samples of
..... EVERLOCK industrial fasteners and cold-headed specialties.

Name..... Title.....

Company.....

Street.....

City..... Zone..... State.....

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BROWN NEW MANAGER OF M&T WELDING DIV.

Robert T. Brown has been appointed manager of the Welding Division, Metal & Thermit Corporation. He replaces A. J. Fisher, Jr., who was recently named executive vice president.

Prior to his new position, Brown was sales manager of the Welding Division. His new responsibilities also include research and production of the Murex line of welding machines, electrodes, and accessories.



EBERHARDT JOINS STANSCREW SALES STAFF



John A. Eberhardt has joined the sales force of Standard Screw Co., Bellwood, Ill. He will cover the western New York and western Pennsylvania territory, replacing J. A. Businger who resigned. Eberhardt was formerly in the marketing research department of Hearst Advertising Service and has been an insurance salesman. He attended Kent State University and Baldwin-Wallace College.

HUCK NAMES WESTERN DIVISION MANAGER

Appointment of William B. Huegin as commercial division manager for the eight western states was made concurrently with announcement of a general sales reorganization based on alignment with basic product markets.

Huegin will direct Huck's sales engineering program in western commercial applications other than those in the aircraft industry. He will have offices in Huck's Western Branch building in suburban Los Angeles.

Huegin studied engineering at Ohio State University and

holds a degree in business administration from Northwestern University. He joined Huck in 1951 as an engineering representative.

CLEVELAND CAP PROMOTES L. G. JOHNSON

L. G. Johnson has been named northern California district sales manager by The Cleveland Cap Screw Company, Cleveland, Ohio. He will supervise sales operations throughout northern California from Fresno to the Oregon border.

Johnson was formerly a salesman in the Los Angeles area for the firm. He will work out of the company's South San Francisco warehouse.



GROENING ADVANCES AT UNITED WELDERS

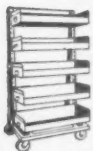
Robert E. Groening has been appointed general sales manager of United Welders, Inc., Bay City, Mich. After five years with the company, Groening will now be responsible for sales efforts as the company increases its emphasis on special-purpose automated welding and processing machines.

BUSBY NEW EUTECTIC FIELD SUPERVISOR

John T. Busby has been named field supervisor by Eutectic Welding Alloys Corporation, Flushing, N. Y., according to an announcement by Rene D. Wasserman, President. He was previously a technical representative with the company. Prior to joining Eutectic, Busby was a Navy welding instructor. In his new position, he will be responsible for the training of technical representatives.



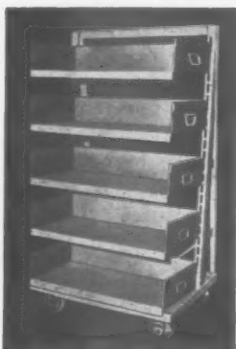
THE VER-T-RACK THE ACME OF VERSATILITY



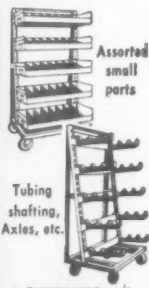
For small parts



- ELIMINATES MATERIAL DAMAGE
- REDUCES WORK-ER FATIGUE
- MAXIMUM EFFICIENCY AT MINIMUM COST



HEIGHT—65½" LENGTH — 35"
WIDTH — 24" CAPACITY 2000 lbs.



- EXPEDITES MATERIALS UP TO 60% FASTER
- SAVES MAN HOURS
- SAVES FLOOR SPACE
- GREATER SAFETY FACTOR

Equipped with 6" roller bearing steel wheel casters

VER-T-RACK can be handled with lift truck.

Trays are adjustable on **VER-T-RACK**

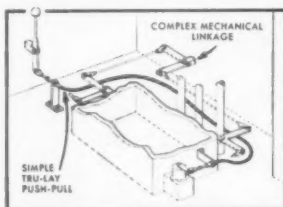
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Index to Products Advertised

Accessories, power tool, 12, 15, 16, 54, 65, 90
 Adhesives, 74
 Assembly line accessories, 94
 Assembly machines, 88, 92
 Assembly tools, manual, 15, 54, 67, 80, 85
 Assembly tools, power, 4-5, 16, 38, 58
 Bits, insert, 54
 Bolt driver, 4-5
 Bolt making machinery, 64, 70
 Bolts
 Carriage, 11, 68, 4th C.
 Hanger, 4th C.
 Lag, 50 A-F, 68
 Locking, 34
 Machine, 11, 68
 Special, 42
 Standard, 11, 42, 77, 4th C.
 Stove, 4th C.
 Brazing preforms, 76
 Bushings, 26
 Clips, 56
 Cold heading machinery, 64, 82
 Controls, remote, 94
 Drivers, torque control, 90
 Eyelets, 64
 Fasteners
 Aircraft, 8, 32, 48
 Blind, 20, 72
 Cold headed, 2d C., 27, 31, 46, 57, 61, 78, 81, 93
 Corrosion resistant, 32, 42, 74, 75, 86
 Locking, 19, 30, 34, 36
 Miniature, 48, 57, 75
 Nylon, 60
 Panel, 6, 8
 Plastic, 72
 Quarter-turn, 8
 Quick-release, 8
 Special, 8, 19, 27, 31, 42, 46, 55, 57, 61, 75, 78, 91, 92, 93
 Standard, 11, 18, 19, 22, 30, 32, 36, 37, 42, 46, 48, 50 A-F, 68, 72, 75, 86, 93
 Weld, 19, 68, 91, 95
 Feeders, parts, 12, 65, 86, 88
 Flux, brazing, 76
 Grommets, 72
 Insert, nylon locking, 14
 Inserts, self-tapping, 61
 Inserts, threaded, 3, 95
 Latches, 8
 Lubricant, 72
 Nails, special, 27
 Nut driver, 80
 Nut runner, power 4-5, 38, 58
 Nuts
 Aircraft, 32, 48
 Blind, 6, 20
 Brass, 43, 75
 Cap, 19, 75, 86
 Castellated, 43
 Clinch, 68, 91
 Conduit, 86
 Finished, 86
 Flange, 19
 Full, 42, 91
 Hex, 75
 Jam, 68, 91, 4th C.
 Lock, 19, 30, 32, 36, 48, 86, 91
 Knurled, 42
 Machine, 42, 75, 86, 4th C.
 Miniature, 48, 75
 Fabricated w/washer, 19, 43
 Panel, 6, 8

Screw machined, 62
 Special, 6, 19, 20, 42, 43, 75, 91
 Spring, 86
 Standard, 18, 19, 42, 48, 62, 91
 Terminal, 36
 Thumb, 75
 Turned, 75
 Weld, 19, 68, 91, 95
 Wing, 42, 86
 Parts
 Cold headed, 2d C., 27, 46, 57, 61, 78, 93
 Die cast, 60
 Hot forged, 78
 Machined, 62
 Stamped, 76
 Pins
 Dowel, 18, 63
 Locking, 74
 Solid, 74
 Spring, 89
 Taper, 18
 Pliers, 15, 67
 Press, assembly, 83
 Racks, portable, 94
 Retaining rings, 22, 60
 Rivets, 18, 20, 23, 27, 57, 66, 69, 73, 88, 90, 92
 Riveting machines, 23, 44, 66, 69
 Screwdrivers, clutch head, 54
 Screwdrivers, Phillips, 54, 81
 Screwdrivers, power, 38, 58, 92
 Screwdriver tips, magnetic, 54
 Screws
 Cap, 11, 47, 55
 Dowel, 4th C.
 Drive, 27, 4th C.
 Lag, 42
 Locking, 18, 34, 37
 Machine, 37, 50 A-F, 4th C.
 Magnetic, 18
 Miniature, 57
 Phillips, 18, 37, 42, 81
 Sems, 61, 83
 Set, 11, 42, 62, 77, 3d C.
 Special, 27
 Standard, 11, 47, 50 A-F, 3d C.
 Tapping, 4th C.
 Thread-cutting, 42, 93
 Wood, 50 A-F, 4th C.
 Sockets, impact, 15
 Solder rings, 76
 Springs, 76, 80
 Stud driver, 4-5
 Studs, collared, 61
 Studs, locking, 34
 Studs, standard, 4th C.
 Terminals, 93
 Thread rolling machinery, 84
 Ties, wire bundle, 94
 Trays, parts, 94
 Washers
 Brass, 43
 Brazing, 76
 Finishing, 42
 Flat, 43
 Locking, 10, 18, 42, 93
 Lockers, resistance, 2, 83
 Wire, cold heading, 39
 Wire forms, 56, 76
 Wire ties, 94
 Wrenches, 15
 Wrench, end 85
 Wrench, ratchet, 85
 Services, engineering, 2d C., 15, 16, 20, 23, 26, 27, 31, 33, 37, 42, 55, 57, 60, 61, 78, 83, 86, 90, 91, 92, 95

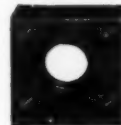
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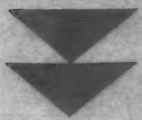
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CONTENTS in this issue



Don't overlook these articles

FEATURES

24—When and Where to Use Custom Fasteners

Material specifications, plus examples of custom fasteners in products from toys to TV.

28—The Economics of Portable Pneumatic Tools

A discussion of percussion and rotary air-powered tools, plus consideration for operating costs.

35—Relay Assembly in Controlled Atmosphere

How electronic relays are assembled in a super-clean room at Clare plant.

39—Butt Welding Thin Gauge Metal

Describing welding techniques and roll planishing of seams.

45—Mousetails Secure Missile Compounds

How rubber straps hold down small electronic components during missile firing.

49—Fastener Drills and Taps Own Hole

A report on a fastener which is especially adaptable to sheet metal assemblies.

IDEAS AND REPORTS

17—Automatic Machinery for Bonding

Indexing machine bonds brake linings at rate of 800 work-pieces an hour.

18—Riveter Has Automatic Loader

Machine can rivet bail-holding ears on 700 paint cans per hour.

19—Hex Bolts Cut Construction Costs

Construction firm reports saving about 10 manhours per 1000 fasteners.

21—Wire Inserts Molded in Plastic

Molded inserts help provide seal that has withstood pressure tests up to 500 psi.

21—Guaranteed Brazed Fuel Line Joints

Aircraft requirements lead to development of equipment for production line use.

22—Adhesive Solves Electronic Problem

Bonds a plastic tube to aluminum cover plate for a shaft position digital encoder.

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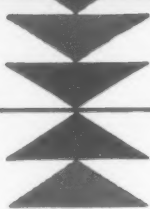
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ACCURATE THREADED FASTENERS, INC.	42	LEMERT ENGINEERING, INC.	73
ADJUSTABLE BUSHING COMPANY	26	LONG-LOK CORPORATION	36
ALLEN MANUFACTURING COMPANY	63	LUCAS-MILHAUPT ENGINEERING COMPANY	76
ALLMETAL SCREW PRODUCTS COMPANY, INC.	18		
ALPHA-MOLYKOTE CORPORATION, THE	72	MAC-IT PARTS COMPANY	77
AMERICAN CHAIN & CABLE COMPANY		MACLEAN-FOGG LOCK NUT COMPANY	19
(Automotive & Aircraft Division)	94	MELLOWES COMPANY, THE	10
AMERICAN RIVET COMPANY, INC., THE	92	MIDWEST SINTERED PRODUCTS	
APEX MACHINE & TOOL COMPANY, THE	54	CORPORATION	43
AUTOMATION DEVICES, INC.	86	MILFORD RIVET & MACHINE COMPANY, THE	69
		MORRIS COMPANY, THE ROBERT E.	
		(Rem Sales, Inc.)	82
BASNIK COMPANY, THE VINCE	94		
BEHR MACHINERY & EQUIPMENT		NATIONAL LOCK COMPANY	46
CORPORATION	64	NATIONAL LOCK WASHER COMPANY, THE	60
BOOTS CORPORATION	95	NATIONAL MACHINE PRODUCTS COMPANY	
BRIDGEPORT HARDWARE MANUFACTURING		(An SPS Company)	30
CORPORATION, THE	80	NATIONAL MACHINERY COMPANY	70
BRISTOL COMPANY, THE	85	NATIONAL RIVET & MANUFACTURING	
		COMPANY	23
C. E. M. COMPANY, INC.	89	NATIONAL SCREW & MANUFACTURING	
CHANDLER PRODUCTS CORPORATION	55	COMPANY, THE	34
CHICAGO PNEUMATIC TOOL COMPANY	4, 5	NYLOK-DETROIT CORPORATION	14
CHICAGO RIVET & MACHINE COMPANY	66		
CLECO DIVISION (Reed Roller Bit Company)	58		
CONTINENTAL SCREW COMPANY	37	OHIO NUT & BOLT COMPANY, THE	95
COOK & CHICK COMPANY	92		
		PHEOLL MANUFACTURING COMPANY, INC.	Second Cover
DECKER NUT MANUFACTURING		PRUTTON CORPORATION	84
CORPORATION	68		
DETROIT POWER SCREWDRIVER COMPANY	65		
DIMCO-GRAY COMPANY	68		
DIXON AUTOMATIC TOOL, INC.	88		
DRIV-LOK SALES CORPORATION	74		
DUDEK & BOCK SPRING MANUFACTURING			
COMPANY	76		
ELASTIC STOP NUT CORPORATION			
OF AMERICA	48		
ELCO TOOL & SCREW CORPORATION	57		
FASTEX DIVISION (Illinois Tool Works)	72		
FEDERAL MACHINE & WELDER COMPANY,		REM SALES INC.	
THE	83	(Sub. of The Robert E. Morris Company)	82
FISCHER SPECIAL MANUFACTURING COMPANY	75	REPUBLIC STEEL CORPORATION	78
		ROCKFORD SCREW PRODUCTS COMPANY	50A-F
		ROSAN, INC.	3
		RUBBER & ASBESTOS CORPORATION	74
		RUSSELL, BURDSALL & WARD BOLT &	
		NUT COMPANY	31
GAGNIER FIBRE PRODUCTS COMPANY	56		
GOODRICH AVIATION PRODUCTS, B. F.			
(Division of B. F. Goodrich Company)	20		
GRIES REPRODUCER CORPORATION	60		
GRIP-NUT COMPANY	91		
HANSOM & COMPANY, INC., H. F.	88		
HASSALL, INC., JOHN	27	SCREW RESEARCH ASSOCIATION	81
HOLO KROME SCREW CORPORATION, THE	47	SET SCREW & MANUFACTURING COMPANY	12
HUBBELL INC., HARVEY	61	SNAP-ON TOOLS CORPORATION	15
		SOUTHCOT DIVISION (South Chester Corporation)	8
		SOUTHERN SCREW COMPANY	Fourth Cover
		STANDARD PRESSED STEEL	
		COMPANY	Third Cover
		STANDARD SCREW COMPANY	11
ILLINOIS TOOL WORKS (Fastex Division)	72		
INDUSTRIAL RETAINING RING COMPANY	22	TEALE MACHINE COMPANY	62
INGERSOLL RAND COMPANY	16	THOMPSON-BREMER & COMPANY	
		(Div. American Machine & Foundry Co.)	93
		THOMSON MANUFACTURING COMPANY,	
JACOBSON NUT MANUFACTURING		JUDSON L.	90
CORPORATION	86	THOR POWER TOOL COMPANY	38
		TITAN TOOL COMPANY	90
		TOMKINS JOHNSON COMPANY	44
KEYSTONE STEEL & WIRE COMPANY	33		
KLINCHER LOCKNUT CORPORATION	32		
		UNITED SHOE MACHINERY CORPORATION	64
		UTICA DROP FORGE & TOOL DIVISION	
		(Kelsey-Hayes Company)	67
LAMSON & SESSIONS COMPANY	6		
LA VISTA MOTEL (Congress of Motor Hotels)	86		
LEE SPRING COMPANY			
(Division of Leetronics, Inc.)	80	WELDMATIC DIVISION (Unitek Corporation)	2



ONE LAST WORD

The Fault Lies In Us, Not In Time



"There is not enough time," runs the chant, "for me to do all the things I want to do." And there is not one of us who has not despairingly beat his breast over his inability to coax another deed out of the day. How many more mountains would we climb, how many more bridges would we build had we more time, we say.

And thus, with noble resolution we determine to attack time, and make it our slave; we will bring it to its knees, we say.

Time has no beginning, no end, no dimension, no substance. It is, was, and will be knowing no birth, no death. "Time is the image of eternity," said Diogenes Laertius. Time cannot be harnessed. Our feeble efforts to husband it, or to force it at lance point into our service is vain. We cannot manage time, we can only manage our acts; our doing is at fault for our not doing more.

As we do not manage the miles of the distance we travel, so do we not manage the time in which we act. How we act, and what we do determines our accomplishments, and only that will be recorded in the book. Of time no man has more than another. Neither king nor pauper, scientist nor laborer has more of it; each is placed in it at birth and the good book will only record what we did in it.

How many things of slight value are we engaged in only because any other important thing is too much trouble or too ardu-

ous? Do we not do too much of empty consequence, only to be able to say, "I was so busy doing that, I could not do the other?" Time thus is made the scapegoat for our indolence.

Are we quite often not humming dynamos of activity? Do not walls, floors and ceilings tremble with our heroic exertions? And more often than not is this not mighty foolishness? Too frequently we labor mightily only to bring forth a mouse. To do more is not as much at issue as to do more of that which is important. Do we not play too much, sleep too much, lunch too heavily, watch television ad nauseum, talk too much nonsense to too many people? Is not most of our doing concerned with trivialities, inconsequentials lengthened and embroidered, and made more of than is necessary? Do we not procrastinate on the vital, important matters?

We blame our lack of good reading, our laziness to think, our indolence to plan, our selfishness to serve, and our rejections of pleasures of the intellect and the arts on time. There is no time. It is not in time our fault lies but in our doing, in our acts.

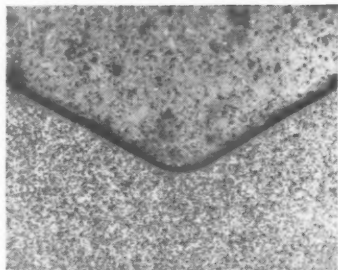
Time is neither ally nor enemy. She cannot bestow the laurel nor withhold it. Our doing, now, is the victory or defeat which will be read in the book tomorrow. We guide the writing hand, not time; the book will never say, "He had no time." The page will merely be blank.

Wm. F. Schleish

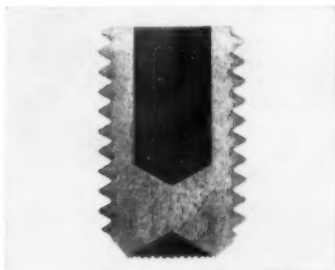
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PLAIN TALK ABOUT **HIGH TORQUE**

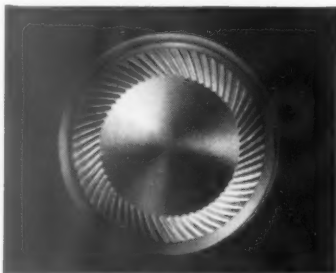
(and how these **UNBRAKO** set screws help insure high reliability)



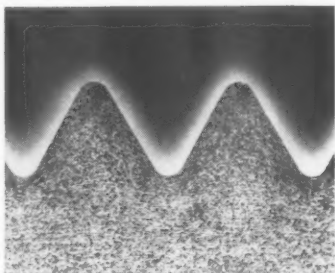
Radius socket corners distribute stresses developed when tightening



Deeper socket means optimum wrenching power



Knurled cup point makes screw self-locking



Fully formed threads for greater over-all strength

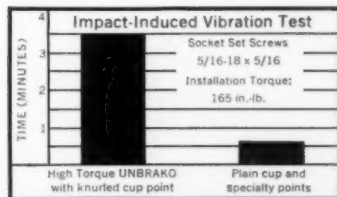


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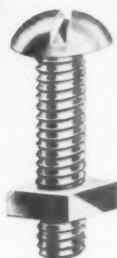
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